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See Advert. Page 17



"THE TIMES" OF THE TRANSPORT WORLD

ROAD PASSENGER TRANSPORT TRENDS

See Pages 2 and 6

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PRICE NINEPENCE

Tribute to Brunel

CELEBRATED in fitting style on May 1 was the centenary of the completion of the Royal Albert Bridge over the Tamar which, linking Plymouth and Saltash, provides the southern rail access into Cornwall. In the forecourt of the freshly painted and decorated Saltash station, and within sight of Brunel's masterpiece, a plaque was unveiled paying tribute to a genius amongst whose many engineering achievements pride of place is enjoyed by the Great Western Railway. Its successor, the Western Region of British Railways, participated with the municipalities of Saltash and Plymouth in doing justice to a great occasion. It began at 10.5 a.m. with the departure of a special train from Plymouth (a station now being reconstructed under the modernisation plan) composed of first-class coaches in the handsome G.W.R. livery and hauled by Castle-class locomotive *Isambard Kingdom Brunel*. At Saltash the "foreigners" from across the river fervently fraternised with county councillors and civic heads from all parts of the Duchy and proceeded to a service of thanksgiving conducted by the Vicar, Rev. J. C. Boyes, and attended by the Bishop of Truro in the ancient parish church where Brunel was wont to worship. Background for the unveiling of the plaque was a handsome blue and embellished façade, the ceremony being performed by the Mayor of Saltash, who was introduced by Mr. R. F. Hanks, chairman of the Western Area board. The bridge, said Alderman Stanlake, remained Cornwall's lifeline, as it had always been since 1859, an outlet for Cornishmen going to seek their fortunes afield and an inlet for "foreigners." Its opening by the Prince Consort had taken place near that spot a hundred years ago, but its creator had been prevented by illness from attending the ceremony and later crossed the completed structure resting on a couch shortly before his death at the age of 53.

Cornwall's Lifeline

THE value of the bridge as Cornwall's main approach—the subject of special articles in the May 2 and present issues of MODERN TRANSPORT—was also stressed by the Lord Lieutenant of Cornwall, Sir Edward Bolitho, when responding for the guests at a civic luncheon in Saltash Guildhall after the Mayor had read a telegram of congratulations and good wishes from the Queen. The bridge, he said, had set up the biggest industry in Cornwall—tourism—and everyone should support the railways so that visitors might continue to flow there on the principle that "the more we get from that foreign country across the Tamar the better it is for Cornwall." With many others he regretted it had not been possible to retain the title "Great Western Railway," the source of so much pride among passengers and railwaymen. Fears that the projected road bridge may detract from the older structure were dealt with by Sir John Carew Pole, chairman of the Cornwall County Council and a member of the Western Area board, when opening in the afternoon the centenary exhibition at Plymouth Museum and Art Gallery, described on page 8. The Fine Arts Commission, he said, while approving the plans for the new bridge, had itself pointed out that the clash of architectural styles would lessen the visual appeal of the Royal Albert Bridge. Unfortunately there was no alternative. Brunel himself would have recognised the need for a road link to enliven Cornwall's economy, and the cost of a tunnel would be prohibitive. There was no other place where a road bridge could be built, but it would be situated 50 yards to the north of the railway bridge, which would therefore continue to be seen without interruption by people looking up the river. Before going to Saltash to attend the official switching-on of the bridge illuminations by Bridge Examiner F. Edworthy, introduced by Mr. K. W. C. Grand, lately general manager of the region and now a member of the B.T.C., guests attended a civic dinner at Plymouth, when further tribute was paid to the master. Arrival of the special train at Plymouth at midnight closed a memorable day.

CURRENT TOPICS

Railway Developments Apace

SPEAKING at the annual banquet of the Birmingham Chamber of Commerce on Friday of last week Sir Brian Robertson, chairman of the British Transport Commission, said that the export express service had a proved record of first-class reliability. He referred also to the greater number of fitted freight services and the fact that the unequalled Condor service between London and Glasgow had never been late yet. The railways were not asking for favours, but he was sure that their good endeavours deserved some encouragement. Their services must

I should like to reassure them that we are not losing money by so doing. I prefer the attitude of the Road Haulage Association when they say, as they do in their manifesto, that we and they, the public haulage operators by rail and road, would benefit ourselves and our customers by co-operating to produce the best possible service, while continuing to be competitive on price." The railways, he continued, were in midstream of modernisation. They were also engaged on a slimming process which was not a symptom of decay but something necessary for their future health and prosperity. They would

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stand on their merits for quality and price. On the other hand, they should be spared prejudice. In the Birmingham area a wide extension of diesel train services, at a cost of some £2 million, had been completed, and better results had followed. Passengers using the diesel suburban services run by the London Midland Region in the Birmingham area rose by over 31,000 in January this year, compared with the same month last year. On the Birmingham-Lichfield line, journeys had increased from 32,000 monthly when there were steam trains to more than 95,000. They were encouraged, too, by the well-maintained use of the longer-distance inter-city diesel trains to and from South Wales. Quality did mean business. Among more dramatic developments to come were the high-speed de-luxe Pullman trains due next year between Bristol, Wolverhampton, Birmingham and Paddington. Quality of service was also the object of the electrification of the main line between Manchester, Liverpool and Euston, which they now aimed to accelerate; a number of inter-urban lines in the area would be converted to electric traction at the same time. In conjunction with electrification plans they planned to rebuild the great station at New Street, harmonising the scheme with the plans of the City Council for the redevelopment of the central area of the city.

Freight and Passenger Charges

AS regards freight services, said Sir Brian, a lot was being done to modernise and simplify both the marshalling yards and the freight depots. Important work at Lawley Street would be completed by the end of this year. "As to price," he said, "I feel a good deal of confidence in saying that the railways today are quoting very competitive charges. I take it as confirmation of this that some of our competitors have recently made representations to the Government to complain that we have been cutting our charges.

emerge from the crisis with added strength, but it was a difficult and uncomfortable process. A thoroughly realistic attitude on the part of all concerned with railways was needed. Management must be realistic in adapting the services in extent, quality and price to the needs of the present and the future, and must not imagine that the good old days could be conjured back by applying the good old ways. The men in the industry must be realistic, and understand that their future prosperity depended upon the future prosperity of the industry and not imagine that some fairy godmother would produce some other answer. Trade and industry should be realistic too about the railways. "The Association of British Chambers of Commerce have informed me clearly and recently that they regard the retention of an efficient and economic rail service in this country as essential to the prosperity of the country and of their members. If this is so, then realism demands that the railways should be judged fairly on the basis of their true merits and not of past prejudices. The travelling public must also be realistic about the question of fares. Railway fares have gone up much less than most other prices. The railways cannot be expected both to pay their way and to peg their fares at uneconomic levels."

Port Developments at Hull

IT is announced by the British Transport Commission that new port facilities at Hull, comprising the reconstructed Riverside Quay and major developments along the south side of the adjacent Albert Dock, are to be formally opened on Tuesday next by H.R.H. the Princess Royal. Apart from the new Riverside Quay, the works include the quay facing Albert Dock, seven transit sheds, a passenger building, and a system of roads, railways and other facilities including 18 wharf cranes. The former River-

side Quay, fronting directly on to the River Humber, was a wooden structure and was wholly destroyed by enemy action in 1941. It had, since its inception in 1907, been a centre for the landing and distribution of the fruit, vegetables and provision traffic from European countries for which Hull has for many years been an important port. The new structure, of reinforced concrete throughout, comprises a quay 1,065 ft. long, equipped with three 7½-ton and six 3-ton electric cranes which serve three transit sheds each 280 ft. long and 82 ft. 5 in. wide. On the Albert Dock side four similar sheds have been constructed, served by eight 6/3-ton electric cranes and one of 10-ton capacity on a quay 1,513 ft. in length. The new works, which will contribute valuably to the facilities and amenities of the port of Hull and will expedite the turn-round of shipping, have been completed at a total cost of £1½ million.

To Improve Competitive Power

WHEN the President of the Board of Trade, Sir David Eccles, formally opened Kelvin House, Wembley, on Monday of this week it marked completion of a further stage in the consolidation of the aviation, marine and industrial divisions of S. Smith and Son (England), Limited. As already recorded in MODERN TRANSPORT, it was decided some months ago to establish a co-ordinating board to simplify administration and exchange of information between the organisations in the group and to knit together their competitive resources. As Mr. G. B. G. Potter, managing director of the divisions, said in his speech at the opening ceremony, there was felt to be plenty to gain and little to lose by association. There was enough competition from other sources, particularly overseas, and the result had been the establishment of a group which was a world force in the instrument industry instead of six separate entities which singly lacked the strength necessary for survival. Sir David congratulated the group both upon its courage in undertaking the experiment of consolidating the six concerns and upon its wisdom in selecting a site for the new building which was easily accessible but was well outside the central area. No matter how many streets had parking meters, he thought that traffic congestion was likely to worsen. Exports were of vital importance to Britain and the group was well placed to gain successes in that field—the exhibition arranged in the building indicated the wide range of products—but there was always the need to keep ahead because the composition of exports was always changing as developing countries fostered their own industries.

Forward Thinking by P.L.A.

THERE have been occasions when the Port of London Authority has been accused of being unduly conservative, but its policy in recent years has certainly not justified that view and the Thames Navigation Service, which it brought into use on May 1, can, with reason, claim to be ahead of any other port navigation system in the world. It has been under consideration for a decade, but suffered some delay from the wise decision to await international agreement upon the types of equipment to be used. This was not forthcoming until the Hague Convention of 1957, but the P.L.A. had taken time by the forelock and had its plans ready in skeleton form so that it became largely a matter of filling in the details settled by the working party established in conjunction with Trinity House. Meanwhile the Thames Radio Service had been set up jointly with the Post Office as early as 1948. It will obviously take time for the full efficacy of the new service to be appreciated for, as is pointed out in an article on page 22, only a relatively small proportion of the ships using the Thames has the necessary v.h.f. equipment. The rate of installation is considered encouraging and the enterprise of the authority should be well rewarded. The attraction of a port which can keep navigational delays to a minimum will be obvious.



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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

We desire to call the attention of our readers to the fact that Russell Court, 3-16 Woburn Place, London, W.C.1, is our sole London address, and that no connection exists between this newspaper and any other publications bearing somewhat similar titles.

Bus Industry Outlook

LEADERS of the bus industry are occupied with a number of conferences at this time of the year; last month the Scottish Road Passenger Transport Association held a highly successful meeting at Turnberry which was addressed by Mr. John Cooper, general manager of Leicester Corporation Transport; last week the municipal managers had some useful discussions at Lincoln; next week the Public Transport Association meets at Folkestone under the chairmanship of Mr. T. Robert Williams to discuss two papers, to be read respectively by Mr. A. J. White, general manager of Maidstone and District Motor Services, Limited, and Mr. F. H. Clayton, deputy general manager of Liverpool Corporation Transport Department. Mr. White is dealing with some contemporary problems of operators and Mr. Clayton with the operation and future of the double-deck bus, a timely study of one of the most remarkable features of British p.s.v. operation. A further interchange of views between bus operators and their suppliers, this time on an international scale, will be held at the end of this month in Paris under the auspices of the International Union of Public Transport. Such meetings have always been of value, but present-day circumstances, with the sharper-than-ever competition of private transport, makes them of the utmost importance today, because of the opportunities they give of learning what has happened to the other fellow in the search for means of sustaining revenue and reducing cost without losing efficiency.

Depredations of Speed Limit and Tax

NOT all the potential economies are within the power of the bus operator to grasp. As Mr. W. T. James, chairman of Northern General Transport Co., Limited, pointed out to shareholders last month, the industry would be able to effect substantial economies if the unrealistic and archaic speed limit of 30 m.p.h., applied to the public service vehicle, were abolished. "By reason of your company's own very high standard of vehicle maintenance, regular inspections by Ministry of Transport officials and the employment only of professional drivers," he said, "there are good grounds for our claim that there ought to be equality between the private motor car and the public service vehicle in relation to speed restriction. If public service vehicles were permitted to be driven at the same cruising speed as motorists can safely allow themselves, a more even flow of traffic would be maintained, and dangerous overtaking could be greatly reduced." He added that the Budget came as a tremendous disappointment to the bus industry. The Chancellor had not taken a single penny off the 200 per cent duty on fuel oil which at 2s. 6d. per gallon cost the Northern Group—or, more correctly, their passengers—£430,000 last year. It had been confidently hoped that the Chancellor would have abolished this tax for public service vehicles. It was true that the Budget had reduced the road fund licence duty by about two-thirds, a saving of some £45,000 per annum to the group, which would help to stabilise fares and go some way to meet the cost of increased wages, but it was cold comfort compared with the substantial concession hoped for. It was,

in fact, a tax on bus travel and represented a special form of taxation against an essential public service.

Change in Social Habits

THE change which has taken place in the social habits of the public since 1956 is reflected in the number of Northern General passengers carried during the year. From 271 million in 1956, the number dropped to 261 million in 1958. Many people who formerly used buses can now afford to provide their own transport, and more people than ever own television sets which keep them home in the evenings. Nevertheless, the group is still carrying well over twice as many passengers as before the war. "Just as we had to expand rapidly from 1945 onwards to meet the increasing demand for bus services, so now we will have to contract slightly if the fall in the traffic continues," said Mr. James. He believed, however, that future prospects were good, provided that the company continued to give passengers good and courteous service, and that fares could be kept attractive. Northern General, of course, still has 1½d. fares.

The Fares Problem

DEALING on May 5 with the problems of the South Wales Transport Company, Mr. W. T. James, its chairman, said that for S.W.T. the extra cost of the wages award of last October was £45,000 in 1959, and although the company hoped to absorb much of the increase by its constant search for administrative or operational economies, a small increase in certain fares was clearly necessary to recoup the balance. Unfortunately, that application was refused. The company had incurred considerable expense in improvements to its Brunswick and Ravenhill garages and would shortly be involved in providing new premises at Pontardawe, all of which would help to keep down operating costs while keeping up a high standard of vehicle maintenance. There was a limit to what could be done to keep up standards and to economise. Another possible economy would be to cut mileage, but the travelling public did not always take kindly to the pruning of services and passengers would admit (in unguarded moments) that they would be more willing to pay a little more than to have to wait longer for a bus. Local authorities, in objecting to fares increases, might not in the long run be doing such a good turn for the community as they thought.

Good Management

AT the Trent company's annual meeting Mr. R. J. Ellery was also able to point to a holding action on fares, although he reiterated that rises in prices of other commodities were accepted with equanimity, whereas a request for a halfpenny or penny extra on the cost of travel was treated as something unjustified and immoral. Who would be prepared to provide the capital for vehicles, buildings and plant to run a bus service today with the prospect of such a modest return as the bus operator received? Owing to increased wages and failure of substantial relief from taxation further fares applications might indeed be necessary. Mr. Ellery recounted to the meeting a long list of improvements to service, on the Grange housing estate at Gedling, jointly with Derby Corporation to Breadsall, and jointly with Barton express between Derby and Nottingham via the Borrowash by-pass; the last-mentioned had been well patronised. Reductions in cost had been achieved by use of a steam jenny for chassis cleaning, prolongation of the period between docks and overhauls, mechanical washing at Manvers Street, Nottingham, and an improved cash office layout at Derby bus station. Of such are the many aspects of good management comprised in the never-ending struggle to maximise revenue and minimise cost.

Forthcoming Events

Until May 9.—Railway Students Association. Visit to Plymouth.
May 9.—Omnibus Society (Northern). Visit to Middlesbrough Corporation Transport. At Parliament Road Depot, Middlesbrough. 2.45 p.m.
Permanent Way Institution (London). Joint visit with North Wales section to Britannia Tubular Bridge, Menai Straits.
Permanent Way Institution (Leeds and Bradford). Visit to Dinsdale long-welded rail plant.
May 9-15.—Light Railway Transport League. Continental tour.
May 10.—Omnibus Society. Visit to Great Yarmouth Corporation Transport Department. Meet Transport Offices, Caister Road. 2 p.m.
Omnibus Society (North Western and Yorkshire). Visit to West Riding Automobile Co., Limited. Meet Belle Isle, Wakefield. 2.15 p.m.
British Helicopter Rally. At Woburn Abbey.
May 12.—Institute of Road Transport Engineers (Western). Visit to Guy Motors, Limited, Wolverhampton.
Institute of Transport (Leeds G. and S.). Annual general meeting. At Leeds City Transport offices, 1 Swingate, Leeds. 7 p.m.
May 12-14.—Public Transport Association. Annual conference. At Folkestone.
May 14.—Institution of Electrical Engineers. Annual general meeting and paper by Mr. E. C. Cherry, "The Conceivable Future of Telecommunications." At Savoy Place, W.C.2. 5.30 p.m.
May 16-18.—Light Railway Transport League. Annual Convention. At The Hague.
May 20.—Road Haulage Association. Annual dinner. At Grosvenor House, W.1. 7 for 7.30 p.m.
May 24-30.—International Union of Public Transport. Congress. In Paris.
June 16-25.—Institute of Transport. Congress. In Copenhagen.

THE DEVELOPMENT OF THE TROLLEYBUS

1—Origins in Germany

CURRENT COLLECTION PROBLEMS

WITH a number of trolleybus withdrawals in progress in Great Britain its position in passenger transport calls for some examination, since it has some manifest advantages which are shown to perfection on certain systems. As a basis for such a review it is desirable to study its origins, development and progress. Little has been written about its



Dr. Werner von Siemens, who conceived the trolleybus over 100 years ago

historical aspect for many years and it is therefore proposed in this and succeeding articles to trace the ancestry of this hybrid vehicle, and to give some food for thought on the reasons why it now seems unlikely to flourish. The origins of the trolleybus lie in Germany, but from the time of its arrival in the British Isles the subject matter of these articles will be confined to the aspects relative to its development here, as the present day trend in other parts of the world is somewhat different.

The idea of an electric road vehicle is said to

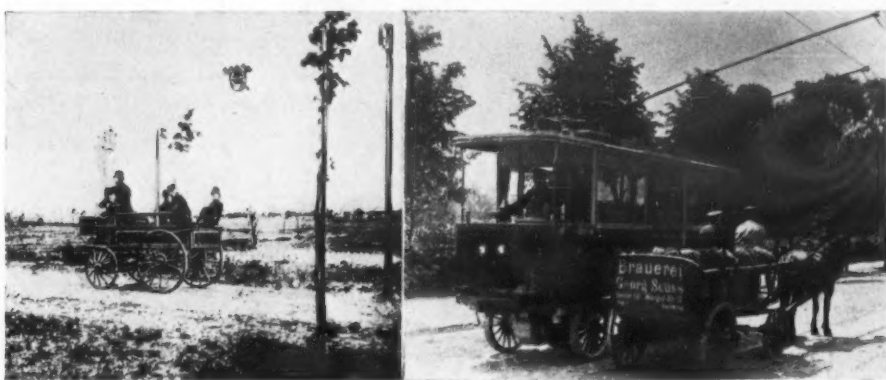
current-collection system using rigid trolley arms. The original design was to have the two poles mounted on the roof of the vehicle one behind the other, but later he modified this to use of one pole with a forked head. The 4-km. line was opened on July 10, 1901, and carried goods and passengers. The first three vehicles had electrical equipment by Siemens and Halske, were completely open at the sides and were each capable of towing a trailer for goods or passengers. After experiments were made in driving the front and rear wheels, Max Schiemann, together with Fritz Mombert, was successful in arranging to drive all four wheels from one motor of 25 h.p. A great deal of experience was evidently gained from this first system, for in 1908 the Railless Electric Traction Company was registered in England to adopt an agreement with these two pioneers, Schiemann and Mombert, and the company flourished for a number of years as these articles will show.

Meanwhile a number of experiments was being made, and these fall into two categories. One involved use of a trolley running along the wires, and the other the rigid pole or poles as is employed today. Frequently on systems using the former only one pair of wires was erected and the vehicles exchanged trolleys on passing. Generally the overhead suspension of the wires was very complicated in such cases, especially at junctions, and it gradually—very gradually, in fact—became apparent that the rigid arm system with two pairs of wires was the most efficient.

Early 20th-Century Schemes

The AEG-Stoll system used in Johannisthal in 1902 incorporated a chain drive to a four-wheel bogie at the front of the car. The current collection was by a light trolley running along the wires connected by a cable to a pole at the front of the vehicle. The whole bus was very heavily built and the state of the roads at that time was not able to stand its daily passing to and fro.

About the same time in Italy the Filovia system was inaugurated between Pescara and Castellamare Adriatico. This arrangement, invented by Dr. A. M. Zani, made use of a rigid arm collector connected to a four-wheeled truck under-running the wires. A heavy chain drive was used to transmit the power from the two 10-h.p. motors to the wheels. A car of this type was shown at the Milan Exhibition in 1906, and a number of lines was



The trials of the first vehicle in the Berlin area in 1882; right, a trolleybus with two 6.5-kW Siemens and Halske motors for Alta Italia of Turin on trial in a Berlin suburb in 1902

have occurred to Werner von Siemens before 1850, but there were then no means for carrying it into effect. After Gramme's invention of the dynamo the use of positive and negative wires overhead was possible. It is known that on October 6, 1881, Werner von Siemens obtained permission to make trials with his invention in the Halensee district of Berlin. A line 540 metres in length was erected and was ready for use on April 29, 1882. The current was collected from the overhead wires by means of an eight-wheeled trolley which was connected by a cable to the top of a short pole in the centre of the vehicle. This road carriage was equipped with two 2.2-kW electric motors placed under the driver's seat. It was known as the Elektromote and was entirely open with seating for four or five in the manner of a ponytrap. The first experiment was not very successful, and the Elektromote was modified in June of that year.

Remarkable Vehicle

Some years appear to have elapsed after these trials before any further public experiments were made. From 1899, however, it is possible to trace a continuous development of the trolleybus, commencing with a remarkable vehicle which was exhibited at the International Motor Exhibition in Berlin that year. This was again the work of von Siemens, and consisted of a vehicle which could run on tram track while charging the battery or independently of the wires by means of accumulators, with the flanged wheels retracted. It could be arranged for driving from either end, although it is not entirely clear how it was steered. Each wheel was driven by a 7½-h.p. motor. Speeds of up to 28 km. per hour were claimed, but it appears to have been a temperamental performer.

In 1900 a system was tried out in France not unlike the arrangement devised by von Siemens. This was known as the Lombard-Gérin system, and was the subject of demonstrations in the Bois de Vincennes during the Paris Exhibition. The drive from the motor was to the rear axle, but the method of current collection proved too heavy and clumsy in use. A line was tried between Fontainebleau and Samois and further experiments were made in Germany in 1901 in Eberswalde, but met with little success.

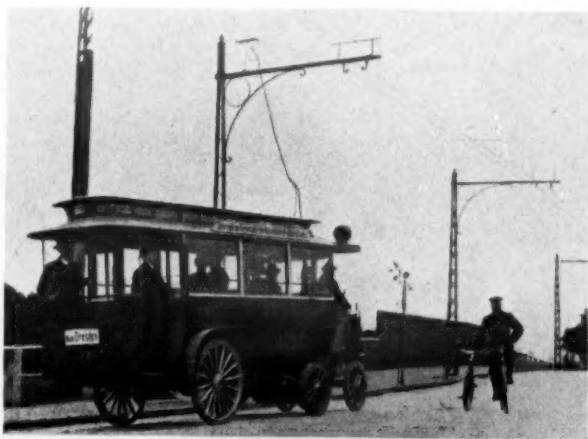
The first system to work a regular service was the Bielethal line, which was built at the personal expense of Max Schiemann, who invented a

constructed with state assistance about this time. The cars were generally of low seating capacity, about 18 to 20 being the rule.

Curiosities

An experiment was made in Germany as a development of the Lombard-Gérin system, known as the Braunschweigische Maschinenbauanstalt. Here that motor was built into the trolley which ran on the overhead wires and pulled the vehicle along the road. Needless to say, this ponderous unit was unsuccessful.

Before tracing the growth of the use of trolley-



A six-wheeled trolley vehicle with four-wheel steering truck and cable connection to the overhead trolley on the Dresdner Halde Bahn between Dresden and Klotzsche about 1903

buses on the continent, two other systems remain to be described, both of which came to be used in England. One is known by a number of names, Cedes-Stoll or Lohner Porsche being the commonest. This method incorporated a four-wheel trolley for current collection; the vehicles had hub-mounted motors. It was designed by Ludwig Stoll of the Austrian Daimler Company, and enjoyed quite an amount of popularity, particularly in Austria commencing about 1909-1910. The other is the arrangement known as the Lloyd-Köhler or Bremen, and consisted of the two wires placed one above the other instead of side by side. A two-wheeled trolley ran on the upper (negative) wire, and a two-ball collector on the lower (positive) wire. This was first installed about September, 1910, in the German city of Bremen.

(Continued on page 20)

PROVIDENT MUTUAL

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3. "Olympic" style polished bumper rails fitted at front, side and rear of vehicles.
4. Special deflector type ventilators fitted at top of all side windows, ten in all, ensuring adequate ventilation without ingress of rain or draughts.
5. Full length partition with glazed panel above waist behind the driver, with half partition to the nearside of driver and pro-

- vision for the fitment of driver's door, if necessary.
6. Roof ventilation unit fitted at rear of roof glazed in opal substitute glass.
7. Continuous type bell contact strip fitted along ceiling over nearside seats.
8. All seats in the face forward position, cushions with foam rubber fillings trimmed in leather and the tubular seat frames have stainless steel top rails.
9. The front and rear exterior roof domes are in glass fibre material.
10. The interior of rear roof domes are lined with solid P.V.C.
11. The batteries are housed under the rear seats and cushions are hinged for the purpose of access.



METROPOLITAN - CAMMELL - WEYMAN LIMITED

VICKERS HOUSE, WESTMINSTER, LONDON, S.W.1

LORRY—BUS—COACH

T.D.G. Bid for Bristol Group

IT was announced on Tuesday this week that Transport Development Group, Limited, has made an offer to acquire the ordinary capital of Bristol Industries, Limited. This is the holding company of a group engaged in warehousing, cold storage, engineering, vehicle sales and service, and bodybuilding besides road transport. The best-known haulage subsidiary is Western Transport, Limited, with headquarters in Bristol and a fleet of some 80 vehicles, other depots being located in London, Birmingham, Manchester, Berkeley and Yatton. Quite recently it was indicated that this company was going into the bulk liquid transport sphere. Other interests in the transport sphere are Alma Garages (Bristol), Limited, Oldland Motor Body Builders, Limited, and Rhodyate Service Station, Limited. Another recent development was the formation of Contract Hire (Cars and Commercial Vehicles), Limited, for the purposes indicated by the title. Western Transport already supplies vehicles on contracts at a number of places.

Transport Development Group comprises 23 trading subsidiaries and already operates some 500 road haulage vehicles, 330 barges, 30 wharves, 80 warehouses and five cold stores. These subsidiary companies are centred on London, Hull and the North East, Liverpool and the North West, Birmingham and the Midlands and South Wales. The group has succeeded in its expansion policy—turnover has increased from £575,000 in 1950 to £3,398,000 in 1958—by organising its activities in such a way that its subsidiary companies retain their identity, local tradition and freedom of enterprise. An investment of £110 in ordinary shares of the group, made in 1950 and presuming no further investment had been made, has a market value today of £935. The directors of Bristol Industries have recommended acceptance of the offer.

Unnecessary Duplication on Bus Routes

REDUCING services at off-peak times is not regarded by Scottish Omnibuses as the answer to declining traffic, according to a review of the situation in its staff journal. Such reductions could mean further traffic losses and wider operation of spreadover duties. One possible aid might be fewer duplicate buses, it is thought. "The provision of a duplicate is justified only if the service bus is unable to cope with all the passengers, and if this principle is applied sensibly by officials and operating staffs substantial savings could be made," says the report.

R.O.S.Co. News and Views

FOR so long as there is any differential speed limit between the various classes of road vehicles outside built-up areas there will continue to be an impediment of traffic flow, says the annual report of the Road Operators' Safety Council for 1958; removal of this differential would both reduce congestion and the risk of overtaking—serious sources of road accidents. R.O.S.Co. recommends that there should be different rules for driving on two- and three-lane carriageways of motorways.

In the case of a two-lane carriageway the outer lane should be reserved to both fast traffic and overtaking vehicles. On three-lane carriageways, the middle lane should be for fast traffic, the outermost for overtaking alone. The practice of changing lanes should in any event be discouraged as it is a great potential source of accidents.

The Council holds to the view that however good roads are, and however good vehicle design, the fact remains that the majority of road accidents is due to human error. Therefore more intensive analysis should be undertaken of the psychological

say that as farmers and their organisations will still pay 2d. a gallon on the diesel oil a dishonest person with the necessary connections could start a serious black market. A solution would be to colour the two categories of oils distinctively. The Minister of Finance did not earmark any portion of the sharp increase for the improvement of roads.

Oil Fuel Sales Soar

STRIKING increases in the consumption of oil for industrial processes and space heating during 1958 are revealed in figures issued by the Petroleum Information Bureau. Road distribution is, of course, used extensively to meet both classes of demand. The use of fuel oil, particularly for steam raising and central heating, increased by 52.7 per cent. For heating rooms and small shops sales of paraffin went up by no less than 41.4 per cent. It is estimated that there are now

not been successful, says the Transport Committee chairman, Alderman L. Chaffey. Revenue on the limited stop buses has been 10d. per mile less than the normal service, it is stated.

Oil Depot on a Pipeline

SOME one hundred road tankers will be used on distribution from a new Shell-Mex and B.P. oil storage and distribution centre at Partington, near Altrincham, Cheshire. The new centre will supply an area of 1,200 sq. miles of Cheshire, Derbyshire, Lancashire and Yorkshire. It will be the first in Britain to be supplied by pipeline; construction began last month. Stocks will be pumped 23 miles from Stanlow refinery.

B.R.S. Moved Vehicles Without Notice

TRANSFER of eight British Road Services parcels vehicles to bases in the South Wales traffic area was referred to in an application before the licensing authority. B.R.S. (Parcels), Limited, applied for licences for a total of 18 additional vehicles to be operated from its depots at Newport, Cardiff and Skewen (Swansea). Mr. R. Beames, appearing for B.R.S. Parcels, admitted at the outset that eight of the vehicles which had been licensed at bases in Yorkshire, the East Midlands and the Metropolitan area, had been in use in the South Wales area for periods up to nearly four years. He called representatives of 11 firms for whom B.R.S. collected and delivered goods and some of them said they would be in dire straits if the service were stopped.

One of the objectors, Mr. S. Powell, director and traffic manager of T.S.P. Transport, Limited, of Skewen, said that in 1956 he applied for an additional vehicle on B-licence for collection and delivery of all goods in the South Wales area but the B.R.S. Skewen depot manager had supported the B.R.S. objection, saying that it was carrying only 70-75 per cent capacity. At that time B.R.S. Parcels was, he submitted, running two vehicles irregularly in the area. Mr. Thomas Ross, managing director of Ross Garages, Limited, said his application had also been objected to by B.R.S. Mr. Williams Entress, managing director of Entress Transport, Limited, Gorseinon, like the two previous witnesses, denied being vindictive or that his objection was "utterly Quixotic." He agreed that if the applications were granted he would not be prejudiced. Mr. T. D. Corpe said B.R.S. Parcels had admitted a serious breach of the regulations and the licensing authority was empowered to refuse the application. Mr. Beames, in reply, said none of the objectors had offered the facilities provided by B.R.S. Parcels and they were using the application as a platform for their grievances. Observing that there were difficulties surrounding the application the licensing authority (Mr. Idris Owen) said he would defer his decision.

Bus and Coach Developments

T. Hoggins and Sons, Wrockwardine Wood, seeks the licences of W. Smith and Sons.

James S. Simpson, Rosehearty, applies for local circular services in Banff, Forres and Macduff.

Burnell Motors (1947), Limited, Clevedon, applies for the excursions and tours from Weston-super-Mare of J. I. and I. D. Williams.

George Ewer and Co., Limited, is acquiring the capital of Scott Brothers (Colchester), Limited, which owns a garage and repair business in Colchester and distributes cars and commercial vehicles.

London Transport has withdrawn its application to withdraw its service between Three Bridges, Crawley and Horsham. (MODERN TRANSPORT, April 25.)



Guy Formidable 4,000-gal. petrol tanker with A.E.C. 112-b.h.p. engine and Homalloy light alloy cab. The high-carrying capacity is made possible by air suspension, which helps reduce tare weight. Dunlop Pneuride trailing arm rolling lobe diaphragm units are employed on both tractor and semi-trailer. Gross weight rating is 20 tons

and physiological aspects of driving. The scale of subscriptions for 1959 and subsequent years was raised on January 1. It was known when R.O.S.Co. was formed in 1955 that the existing subscription did not cover the cost of awards and administration of the safe driving and conductors' award of merit of competitions, and in 1958 expenditure was in excess of subscription revenue.

Diesel Tax Thunderbolt in S. Africa

THERE was a severe shock for South African road transport, a steep increase of 14½d. a gallon in the excise duty on diesel oil, in this year's Budget. The president of the Motor Transport Owners' Association has said that the increase is a further blow to the road haulage industry. First came a general curtailment of the area over which goods of all classes may be carried by road and then a drastic reduction in the amount of coal to be transported by road this year. Other sources

between 8 million and 9 million paraffin heaters in use in the United Kingdom.

The use of oil for electricity quadrupled over the 12 months. Consumption by the power stations increased from 642,242 tons in 1957 to 2,635,431 tons last year. Diesel traction on the railways also increased the use of oil, the railways roughly doubling their consumption from 43,885 tons to 80,000 tons. Gas works increased their use of oil from 445,514 tons to 665,894 tons.

There was a striking increase in sales of oil to private houses for central heating from a total of 80,953 tons to 136,392 tons. Motor spirit deliveries, at 6,623,508 tons, were 15.3 per cent more than in 1957, but they were only 4.7 per cent above their 1956 level. The use of fuel for diesel road vehicles increased by 14.2 per cent.

Limited Stop Service Disappoints

PROSPECTS of extension of Birmingham City Transport limited stop bus operation are considered rather poor. The experimental express service to Glebe Farm, introduced in February, has

BRITISH ALUMINIUM

FOR PLATFORM LORRIES



This Gartsides Brewery lorry was built by Salthouses (Motors) Ltd., Ashton-under-Lyne, on a Bedford Chassis; the aluminium platform body, 17' 9" long and 7' 6" wide, is about 4 cwt. lighter than a comparable steel and timber body. The design is based on standard British Aluminium road transport sections, which can be supplied from stock. Drawings of similar designs are available from the Company's Development Department.

The BRITISH ALUMINIUM Co Ltd



NORFOLK HOUSE ST JAMES'S SQUARE LONDON SW1

MODERNISATION OF GREAT EASTERN LINE

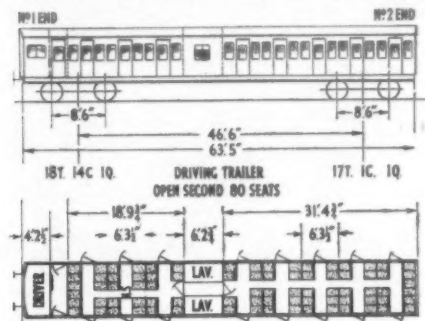
Colchester—Clacton Electrification (Cont.)*

THERE was little heavy civil engineering work involved for the Eastern Region in the electrification of the Colchester—Clacton—Walton lines. The work was, however, varied in character, comprising the alteration of 22 bridges, the cutting back of station awnings, alterations to the track layout at certain stations, provision of load gauges and notices at 26 level crossings, lengthening of sidings at Colchester and Walton, and the provision of an extra siding at Clacton. In addition to this the steam locomotive shed at Clacton has been converted into a temporary inspection and maintenance depot for electric rolling stock and a carriage washing plant is to be installed. Temporary shed accommodation for steam locomotives and two small buildings for staff accommodation have also been provided.

The use of high-voltage electric current demanded the raising or reconstruction of overbridge superstructures to obtain statutory clearance for the

proximity of a level crossing the wire height here has to be higher than that normally required, thus increasing the clear headroom to be provided. This necessitated an adjustment to the surface of the road, but in order to keep this to a minimum, the special type of prestressed concrete deck described in connection with Cook's Green Bridge was used here also, but in this case the depth to simple span ratio was as low as 1 to 30. In this instance the deck consists of factory-made, precast concrete inverted T-beams, 18 in. wide by 14 in. deep, placed side by side and supported from the arch.

The method of fabrication of this deck was similar to that used at Cook's Green but since the final road level was to be rather higher than the original, the final stages of the reconstruction here took a quite different course. The bridge was stripped of its road surfacing and spandrel fill down to the brick arch, half a width at a time,



Arrangement of a second-class open driving trailer and a second-class motor luggage coach initially for the Colchester—Clacton electrified services

overhead wires and the pantograph current collectors on trains. There were six public road bridges to be reconstructed, three occupation bridges to be raised and seven footbridges replaced or raised. In each case the parapets of the bridge had to be raised to conform with statutory regulations.

New Bridge Technique

One bridge, No. 1032, at Cook's Green, carrying the Little Clacton to Great Holland road over the main London—Clacton line, presented the chief civil engineer with a special problem which was solved by the use, for the first time, of a new type of partially prestressed precast concrete slab construction. To obtain the extra clearance required between the bridge soffit and rail level it was necessary that the construction depth of the new superstructure should be reduced to the absolute minimum. By this means the lowering of the tracks was avoided; owing to severe gradients, this would have been difficult to achieve. Alternatively a possible raising of the road level could have been considered, but the existing steep approaches made this undesirable, and in any case Parliamentary powers would have been necessary.

The new type of slab consisted of three or four prestressed, factory made, precast concrete in-

but because of the height of the arch, the deck had to be cast 1 ft. 9 in. higher than its final position. After the demolition of the arch the whole of the deck and cill beams were lowered, in two halves, by the use of jacks, into their final position. During construction only one lane for vehicular traffic was provided over the bridge, and the added concrete was placed over each half of the bridge in one operation before stressing the post-tensioned cables. The abutments of the bridge are finished with sand-faced engineering bricks with artificial stone quoins.

Permanent Way Alterations

Track slewing and the re-positioning of points to make room for the erection of the overhead line equipment was necessary at Colchester, Hythe Junction, Wivenhoe, Great Bentley, Thorpe-le-Soken, Clacton and Walton. At Thorpe-le-Soken station the centre track has been converted for two-way operation so that trains stopped at the station for division into Clacton and Walton portions may be passed by non-stop services.

At Stanway, beyond Colchester, the sidings were considerably enlarged and remodelled and provided with road access to furnish a depot and storage space for steel masts, drums of catenary and contact wire and other material for the con-



Eastgates level crossing, Colchester, showing the clearance warning bells for road vehicles

verted T-beams, 18 in. wide and 10 in. deep, placed side by side. These were encased with high quality added concrete to form slabs 33 ft. 5 in. long, 4 ft. 8 in. or 6 ft. 3 in. wide, and 16 in. deep to accommodate a water pipe. Before this added concrete was placed, solid rubber cores were placed longitudinally between the precast beams to form cable ducts when withdrawn. When the concrete was sufficiently hardened the cores were withdrawn and high-strength steel cables inserted in the ducts thus formed. The cables were then post-tensioned by the Magnel-Blaton system and the ducts grouted with cement grout under pressure. The resulting slab, although only 16 in. deep, is capable of carrying the prescribed Ministry of Transport load with an adequate reserve strength.

At the request of the highway authority and in order to provide realigned approaches in connection with a future road improvement scheme, the bridge was widened, and altered from a square bridge to a skew bridge, thus increasing the span of the deck slabs to 30 ft. The existing road surface and the girder and jack arch superstructure was removed, the road being closed, and the abutment widened to accommodate the new skew bridge and built up to the soffit level of the new deck, below which concrete cill beams cap the increased height of the brickwork and act as bearers for the slabs.

Ipswich Road Bridge

The provision of clearances underneath Ipswich Road Bridge, Colchester, posed similar problems. The original bridge consisted of a skew brick arch with a single span of 55 ft. Because of the

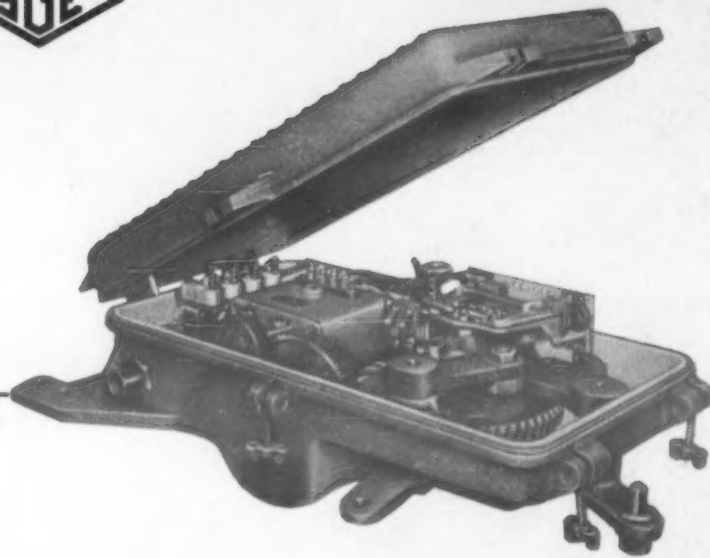
tractor erecting the overhead line equipment. Covering an area of approximately 12 acres, 14 sidings have been laid in. Extensive drainage work was successfully undertaken at Thorpe-le-Soken where the Holland Brook was diverted to a new course so that the embankment could be strengthened. The station awnings at Colchester, Wivenhoe, Alresford, Great Bentley, Kirby Cross, Frinton and Clacton have been cut back to provide lateral clearance for the overhead electrical equipment. The awning at Frinton, being of reinforced concrete, was cut back by the flame of a thermic lance—the first time this method has been used on the Eastern Region.

Rolling Stock

The rolling stock in service on the Colchester—Clacton—Walton line is of the same design as that to be used on the London, Tilbury and Southend line when that line is electrified and the opportunity offered by the electrification of the Clacton line is being taken to test new sets coming from the works and destined ultimately for the L.T.S.

There are 112 four-car sets to be produced, the last of which is due to be finished early in 1960 and each will be tested in turn over the Colchester—Clacton—Walton electrification. This design will also be used for the rolling stock to be built for the electrified services over the Hertford East and Bishops Stortford lines, with the exception that the drivers' cabs will be of a modified streamlined design. In external appearance the stock is similar to that already employed on the existing Liverpool Street—Southend services. With a full complement of passengers a four-car set will weigh approximately 153 tons and the maximum speed

(Continued on page 13)



UNDERCOVER STORY

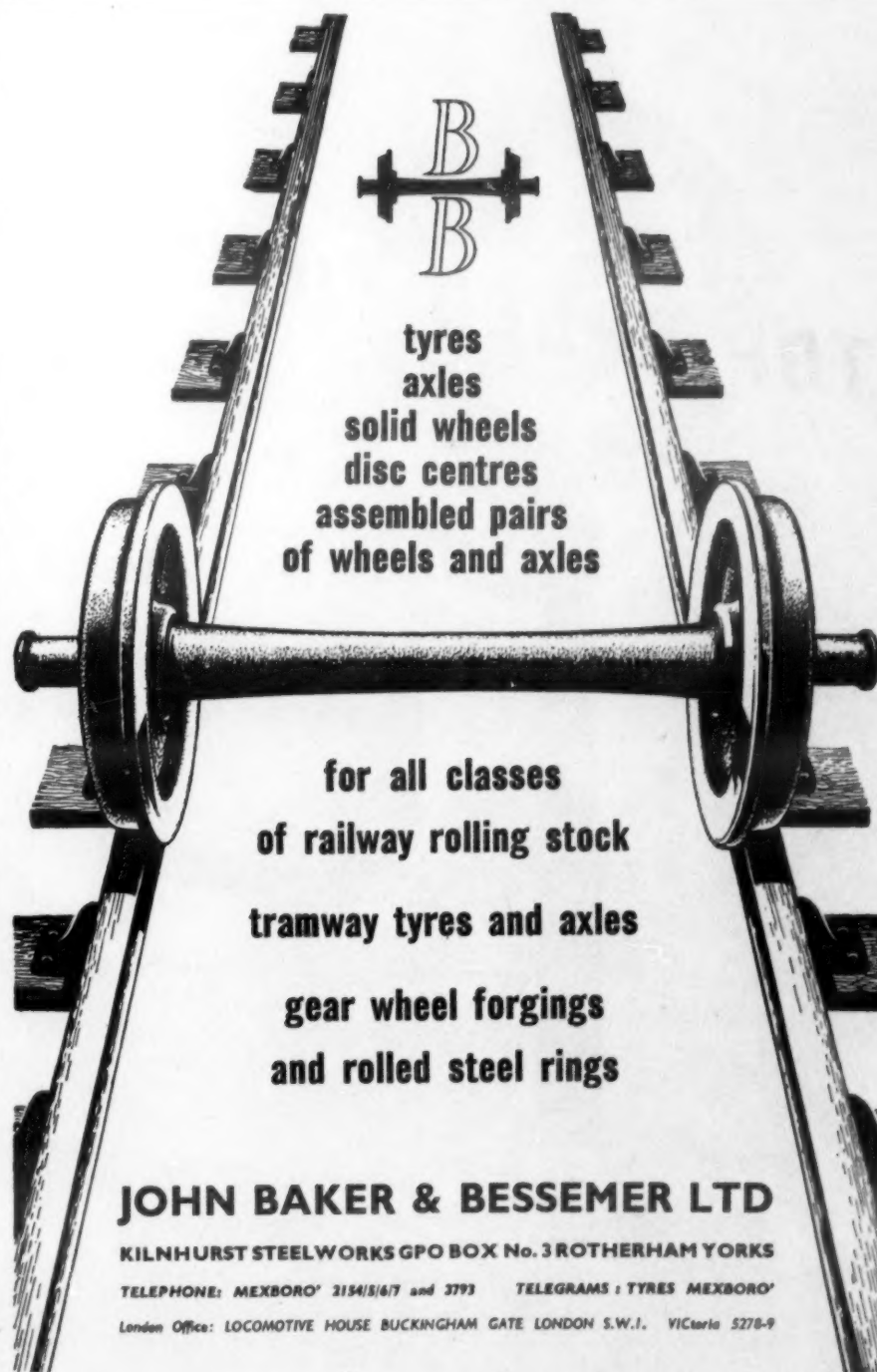
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Another interesting application is the 'sequential operation' facility which may be used for C.T.C. or remote locations where power supplies are limited; it provides that where a point layout requiring two machines is used, they may be arranged to operate one after the other, thus limiting the current drain on a small capacity battery to one machine at a time.

With improvements and additions the fundamental design of this machine has been proved over nearly 50 years and Signal Engineers may continue to install the Type HA with every confidence.

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* Previous article appeared April 18

MODERN TRENDS IN ROAD PASSENGER TRANSPORT

General Review by Engineer-Manager

By RONALD COX, M.Inst.T., M.I.R.T.E.*

It will be readily appreciated that it is impossible to present a detailed picture of progress which has occurred and is continually occurring in the science of road passenger transport engineering, and rather more impossible to forecast the likely trends and probable developments for the future. Hence it follows that only a synopsis can be made and detail must be sacrificed, and the subject has been treated accordingly. I feel that with the many and varied ramifications,

engine overhauls occur at mileages between 200,000 and 300,000 miles.

Conditions vary considerably in different areas, and the mileage at which major overhauls are carried out depends upon operating conditions. Design improvement in pistons has played a major part in diesel engine development and progress in this sphere alone justifies a technical paper dealing specifically with piston improvements.

Since the war, engines have been fitted not only

America air springing is quite common, but in England and on the Continent this design of springing is only now being offered by the chassis manufacturers. Sometimes, as in the case of the Gregoire system, in order to achieve a constant rate of springing, coil springs are used in conjunction with leaf springs. Shock absorbers and stabilisers are no longer vital on all chassis and the Routemaster (London Transport) and Bridgemaster (A.E.C.) vehicles have coil springs fitted to the front and rear axles, but air suspension is now optional. It is interesting to note that the most recent model of the Atlantean (Leyland) has now reverted to leaf springing.

Much thought has gone into the problem of reducing the work of the driver, and power-assisted steering has been developed to minimise driving fatigue. There is an amazing improvement in the steerability of large buses provided with power assistance for steering and with the introduction of the 30-ft. long chassis many more vehicles will be so equipped. The orthodox worm and wheel differential has given yeoman service, but this type of drive has now reached maximum permissible loadings and the modern trend is to use double-reduction gears for rear axles of larger and heavier vehicles.

Axles and Gearboxes

It is noteworthy that one such double-reduction axle has completed over 250,000 miles in a trolleybus, and on inspection was found to be as good as new—no pitting, no flaking and only a darkened appearance on those surfaces not actually in contact. Hypoid gears are becoming standard practice in medium-weight vehicles. Propeller shafts and joints have for 20 years remained virtually unchanged and the name of one manufacturer has become synonymous with propeller shafts.

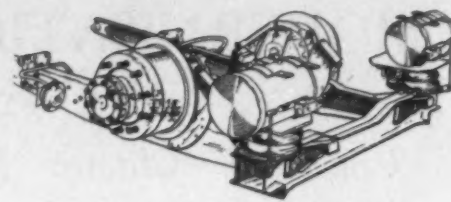
The crash box was superseded by the synchromesh gearbox which, like its predecessor, used the plate clutch for gearchange purposes, but modern development in gearboxes has included the pre-selector gearbox which is fitted as standard to many road passenger transport fleets—including London Passenger Transport vehicles. The air-assisted pre-selector gearbox is now giving way to the more recently designed Pneumo-Cyclic and Monocontrol gearboxes. Fluid flywheel transmission is still used but two-pedal operation is possible because the gearchange is selected pneumatically or electrically.

By utilising an a.c. generator fitted to the tail shaft of a pre-selector gearbox, a fully automatic gearchange unit has been designed and is in service. An Autocontrol gearbox has been in use experimentally at Rochdale since February, 1958, and is providing much useful data. Different manufacturers have embarked upon slightly different designs, but the resultant improvements, by relieving drivers of much strain, will materially contribute towards a reduction in accidents.

Centrifugal Clutches

Several manufacturers have developed centrifugal clutches in an endeavour to improve fuel consumption and, at the same time, provide a rather more smooth transmission. Still in the experimental stage is a unit which consists of a combination of a fluid flywheel and a centrifugal clutch. This unit has been designed to fit existing fluid-flywheel housings, thus enabling an operator to effect a changeover quite simply.

Much of the credit for the extended life of engines must go to the introduction of detergent oils, which,



Latest rear suspension of the A.E.C. Bridgemaster using Dunlop air bags

if removed from engine sumps at correct mileages, keep hard abrasive and carbon particles from bearing surfaces and thus materially improve component life. Some remarkably good bore wear figures are experienced using detergent Supplement 1 lubricating oils, e.g. Gardner 6LWs at Rochdale show approximately .001 in. bore wear per 100,000 miles and pistons remain undisturbed at mileages in excess of 250,000.

Detergent additives have marked an important stage in the development of lubricating oils and more and more operators are using engine oil of a lower viscosity than S.A.E.30, which used to be the usual viscosity range for engine oil. Some operators are using oils as low as S.A.E.10, but in the main the viscosity range of S.A.E.20 is more usual. There has been a reduction from S.A.E.140 to S.A.E.90 for high-pressure lubrication in differentials by some operators, and the introduction of the hypoid form of transmission has required the development of a suitable rear axle high-pressure lubricant.

Automatic Chassis Lubrication

Many chassis are now fitted with automatic lubrication, and this requires the fitting of a suitable unit on each vehicle. The unit consists of a storage tank for the lubricating oil, which is piped from the tank to a pump. The pump has approximately 24 outlets through which oil passes to the points on the chassis requiring regular lubrication. In some cases the pump is operated when the brake pedal is depressed, when a rotary selector allows oil under pressure to be passed to the lubrication point. In other designs the unit is operated by the rotation of a propeller shaft. Whichever method of automatic lubrication is used, the quantity supplied is variable.

Until fairly recently diesel fuel with a low sulphur content was at a premium because such fuel caused the minimum amount of acidic action in cylinder bores, etc., but with the introduction of detergent lubricating oils it is now possible to use diesel fuel with a higher sulphur content without adversely affecting engine bore wear. The percentage of sulphur can vary in normal branded diesel fuels between .08 per cent and .8 per cent. New refining processes developed since the war enable a goodly proportion of sulphur to be extracted from high-sulphur content stock.

Electrical Equipment

When viewed objectively, it becomes strikingly obvious that an amazing amount of progress has been made in developing bus electrical and ancillary maintenance equipment. Smaller and lighter batteries, having the same or greater amp.-hr. capacity than the older types of battery, have been developed. Some of the newer types of battery

(Continued on page 7)



The front entrance and staircase of the Willowbrook 70-seat body on Dennis Loline (Bristol Lodekka licence) chassis and, right, the complete bus as it appeared at the Commercial Vehicle Show last year in Walsall livery

it would be preferable if, for the purposes of clarity, I dealt with my subject in subsidiary divisions, each of which is complementary to the other.

Engines and Chassis

Petrol engines are quickly being replaced in road passenger transport vehicles by diesel engines, and today 82.3 per cent of these vehicles are powered by diesel. The diesel engine, like its younger brother the petrol engine, had teething troubles in its early days when maintenance staffs had little or no experience in diesel units, but during the last 20 years tremendous progress has been made in increasing mileage between docks and overhauls. Prewar it was common practice to remove pistons after operating 30,000 miles and for complete overhauls to be undertaken at 90,000—100,000 miles. Today many vehicles operate well in excess of 100,000 miles before pistons are disturbed and

in the orthodox position between the front wheels, but underfloor, and, more recently and fairly generally on the Continent, at the rear of buses. The underfloor engine was readily accepted by many operators to assist the coachbuilder, because it enabled a larger number of seats to be fitted. Bodymakers were able to produce a most attractive front and give deep and wide visibility for the drivers of underfloor- and rear-engined vehicles. A large number of coaches and buses today have a radiator grille in lieu of the prewar radiator and it is now common practice for the radiator proper to be fitted well to the rear of the grille. This has some advantage when front-end accident damage occurs. Some of the latest developments in bus engines include an air-cooled diesel engine pioneered and developed by the Birmingham and Midland Motor Omnibus Co., Limited.

Suspension, Steering and Transmission

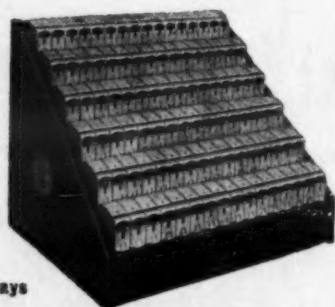
Great efforts are being made to improve the suspension of vehicles, and the most recent developments in this field include the use of rubber and air in place of the conventional leaf spring. In

* Extracts from a paper presented at various meetings of the 1958-59 lecture session of the Institute of Road Transport Engineers by Mr. Cox, who is engineer and general manager of Rochdale Corporation Transport. The paper was awarded an institute diploma.

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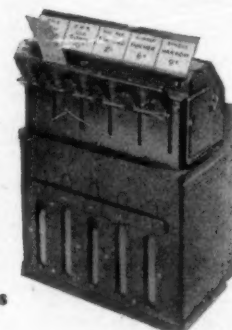
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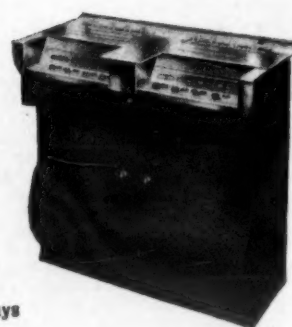
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have hard rubber or moulded cases, although these battery cases are subject to cracking if abused. Dynamos 7 in. in diameter have been developed and most types of dynamo will operate without attention for 75,000 to 85,000 bus-miles. Starters are still not quite as reliable as dynamos, but the modern starter has a far higher torque output than its predecessors and this unit is speedily becoming trouble-free.

A.C. Generators

Alternating-current generators have been much improved and although they are designed to run at very much higher speeds than direct-current generators, recent developments indicate that this type of generator will be much more popular in the future than it has been in the past. Some a.c. generators have been fitted to buses which have been illuminated by fluorescent lighting. Modern p.s.v.s have double-dipping headlamps as standard.

Electrical cables are now obtainable with p.v.c. sheathing which is oil resisting and gives materially improved cable life. Flashing indicators as fitted to buses are very satisfactory and, when compared with the old-type semaphore pattern, are very much more satisfactory.

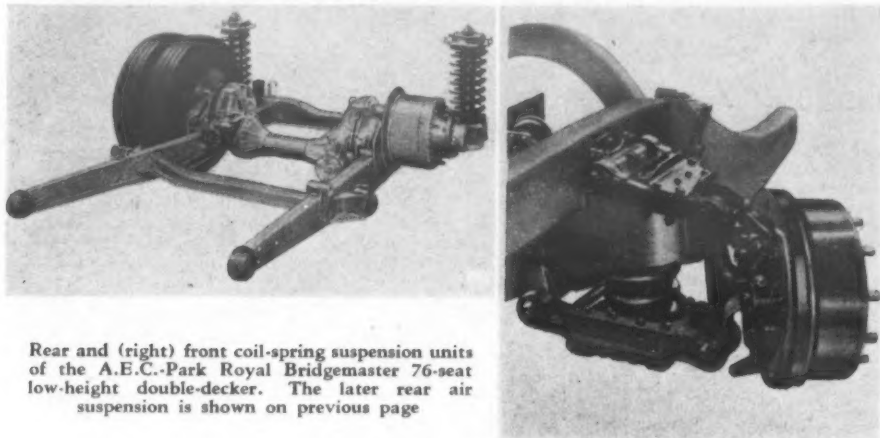
Much more attention has been given of late to ventilation and the conventional half-drop window is being superseded by the smaller type of sliding

platform at one and the same height eliminates the platform step, and this can be a major factor in reducing platform accidents. It is certainly a boon to conductors and passengers.

Very noticeable improvements in design of air-operated and electrically operated doors have been obvious in postwar vehicles, and many double-deck vehicles now incorporate doors. The latest innovation in design has been the development of front-entrance double-deckers and I am receiving interesting comments on the operating experience of this type of vehicle. The fitting of doors to vehicles tends to cause a slight delay at stopping places, but this disadvantage is outweighed by the great reduction in platform accidents and offset by the slight increase in speed which is now possible due to better power units and more modern road surfaces.

Stainless Steel

Stainless steel has superseded aluminium for handrails, and rails made of the former material outlast the vehicle. Designers of seat frames have in their sphere produced seat frames in a stronger yet lighter material and frame breakages are now few and far between. Latex foam rubber is now being universally used as standard for vehicle seats and trimmings are available in hide, nylon, rexine or moquette. A most successful covering for seat



Rear and (right) front coil-spring suspension units of the A.E.C.-Park Royal Bridgemaster 76-seat low-height double-decker. The later rear air suspension is shown on previous page

window. The sliding window enables individual passengers to avail themselves of fresh air, whereas the half-drop window tended to cause draughts. Ventilation of the future will undoubtedly be forced ventilation—hot air in winter and cold air in summer—and it may well be that within the next five to 10 years opening windows will completely disappear and ventilation will be provided artificially.

Bus Bodies

Due to the utilisation of stressed-skin construction which incorporates a large amount of light alloys, bus bodies are now much lighter than the prewar bodies, yet at the same time greater seating capacity has been achieved. Some vehicles on display at the 1956 Commercial Motor Show were equipped with seats considerably in excess of 70 and in 1958 some vehicles were provided with 78 seats. Glass fibre is being used extensively in body construction, and one company operator has produced complete fronts of single-deck buses in this material. Resin-bonded glass fibre is extremely light and durable and easily worked and can be readily repaired and strengthened where necessary, and in many cases accident damage can be repaired in situ. Modern dyes have been manufactured which enable plastics material to be coloured during manufacture.

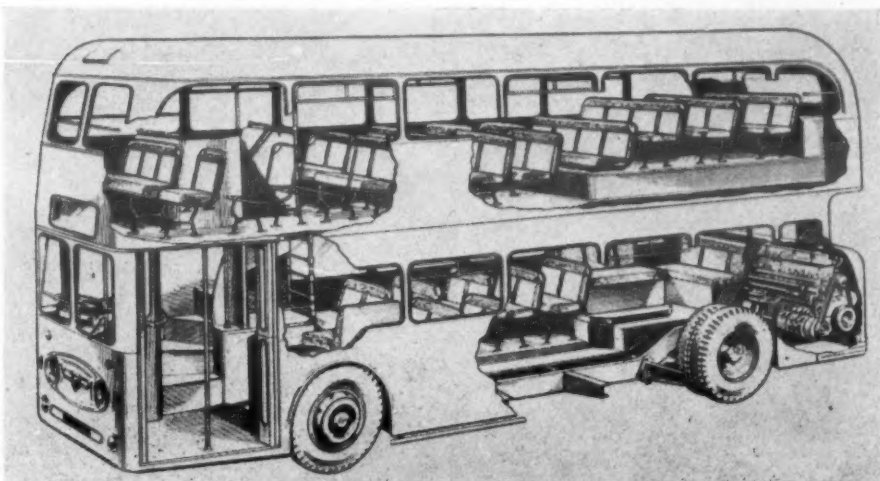
One of the most noticeable alterations in the design of modern bus bodies has been the introduction of the "new look" front, with which front-end damage can be quite expensive and engine removal more difficult. Topping-up of engine oil

backs is Formica which is virtually scratch and cigarette proof.

Painting technique is changing rapidly and efforts have been made by paint manufacturers to reduce operators' costs. The one-coat process has been developed and should provide substantial savings if the material will weather as satisfactorily as normal paint. It would be remiss of me not to comment upon the hot-spray process which is being developed very speedily and which has also been adopted by some operators. Buses are driven on to a hydraulic or electric lift and hot-spray paint is applied by operators standing on either side of the vehicle whilst it is raised and lowered by the lift. It is possible by this method completely to spray the exterior of a double-deck vehicle within a very short period. It is only possible to do this where the livery has one dominating colour. A smart appearance can be assured by more frequent external repaints, with the additional advantage that corrosion of the exterior is kept to an absolute minimum.

Use of Plastics

Many operators have now adopted the technique of spraying chassis with aluminium paint at the conclusion of the annual inspection. Interior finishes have changed with the years, and French-polished cappings have been replaced by steel or aluminium pressings which are stove enamelled. Some finishers are now being produced in glass fibre and plastics material is being used more and more for ceiling panels and may well become the only medium which will be used for this purpose.



Cutaway drawing of the front-entrance rear-engined Leyland Atlantean with M.C.W. 73-seat low-height body. An alternative normal-height version seats 78 passengers

becomes more difficult on a fully fronted vehicle, and I have fitted under-bonnet lights to my vehicles to assist in the adequate topping-up of sumps. One or two undertakings have reverted to the conventional type of front end. Bonnet covers on the orthodox type of double-decker were always very unsatisfactory and worked on the hit-and-miss principle. The improvement in design at the front end has included the one-moving-piece bonnet top, which is spring loaded in both open and closed positions. The modern bonnet top is completely rattle-free, which is more than could be said of its earlier counterpart.

Interior Improvements

The latest design in double-deck buses incorporates the gangway in the lower saloon at the same level as the platform, and a double-decker is now being produced having a total height of only 13 ft. 4 in., although upper and lower saloon ceiling heights have not been reduced. This is achieved by introducing the more modern type of double-reduction rear axle mentioned previously and alteration to suspension, giving a notable improvement in stability. One of the more important factors is that such double-deckers can operate under low bridges which might otherwise require services to be operated by single-deck buses of a lesser carrying capacity. The type of chassis which incorporates the lower saloon gangway and the

Workshops, Depots and Equipment

Many municipal operators have to make do with a converted tramcar depot for at least a portion of their covered accommodation, although several have been successful in modernising their buildings and equipment. Civil engineering progress runs parallel with and supplements road passenger transport engineering—the former has brought us modern granolithic floors, underfloor heating, sprinkler installations, fluorescent lighting and electric- or air-operated individual hoists. White-tiled pits and sunken workshops are now the rule rather than the exception and wide-span pillarless roofs are indicative of the progress in the civil engineering sphere.

Equipment used to service vehicles is always costly, yet if it enables economies to be effected in man hours or f.s.d., the right tool for the job is always the best policy.

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SALTASH AND BRUNEL

Centenary Exhibition at Plymouth

NOTEWORTHY RECORDS

A FEATURE of the celebrations held to mark the centenary of the opening of the Royal Albert Bridge on May 1, reviewed on page 1, was a visit to the Brunel exhibition at the Plymouth Museum and Art Gallery. Arranged by the curator, Mr. A. A. Cumming, and Mr. Bernard Y. Williams, of the general manager's office, Western Region, it contains many interesting paintings, drawings and models; it will remain open until the night of Sunday, May 10.

During the celebrations the Cornish contingent, loud in their praise of Brunel and his achievement at Saltash, had been gently reminded that he was of Plymouth stock and that one end of the bridge was in that city. He was, in fact, born at Portsmouth in 1806, the only son of Marc Isambard Brunel, a Frenchman who made England his home and married Sophia Kingdom of Plymouth. Marc was himself a celebrated engineer, and was knighted for his work in building the Thames Tunnel, the first underwater road tunnel in the world. Included in the exhibition are records of the building of this tunnel, in which the young Brunel assisted his father, thus learning his engineering in the hard way. He was injured, narrowly escaping with his life when the river burst in flooding the works, and it was while recuperating at Bristol that he designed the Clifton suspension bridge, which was completed after his death.

Beautiful signed sepia paintings and designs of this project bear witness to Brunel's skill as an artist, and in the showcases around the exhibition hall can be seen further proof of this in the exquisitely executed pencil sketches in his personal notebooks. The earliest of these is dated 1814, and includes some remarkable drawings done at the age of eight. Other designs show engineering projects, including some preliminary ideas for the Royal Albert Bridge. Several sketches of Egyptian scenes were done in 1858-59, when he wintered abroad in a vain attempt to repair the damage to his health brought on by his Herculean labours, for he built not only the original Great Western Railway but also the steamships that culminated with the *Great Eastern*, for many years the largest

vessel afloat, which was giving him acute anxiety during the winter of 1858-59.

Brunel and the Stephensons

When Brunel, at the age of 27, was appointed engineer for the construction of the proposed Bristol to London railroad there was no undertaking of a comparable size in existence in the world. It was only a few years since steam traction had been shown to be practical; the economic urge had been fostered by the increased cost of horse-fodder after the Napoleonic wars, but steam engines were still experimental, broke down and had to be towed home ignominiously by equine units. Within a remarkably short space of time the two Stephensons, Brunel and the generation of young technicians such as Gooch, altered all this. These great engineers, starting without any accumulated experience and in a new engineering world of yet undefined standards, designed and built railway lines on which it soon became possible to do, in hours, journeys that previously took days. Brunel and the Stephensons approached their problems in different ways. The Stephensons built their lines to a gauge of 4 ft. 8½ in., derived from old "horse and cart" widths, fixing their rails to stone blocks, while Brunel laid his broad-gauge rails 7 ft. 0¼ in. apart, fixing them to longitudinal wooden sleepers which supported the rails continuously in the hope of giving a track over which high speeds could be run, although at first he made it too rigid. An actual piece of his track mounted on a sleeper is shown, together with photographs and models of early G.W.R. engines.

Trestle Viaducts

In addition to his famous Royal Albert Bridge, Saltash, Brunel built many other celebrated bridges in the West Country. Most of these were of wooden trestle construction, and an original drawing of St. Germans viaduct, signed by Brunel, is a reminder of those graceful wooden structures, the last of which, on the Falmouth branch, were replaced a quarter-century ago. (See article on page 11.)

Brunel chose for his London terminus a piece of land at Paddington, then on the outskirts of London. At first a temporary station was used, but later he planned a new terminus based on the design of the Crystal Palace of the 1851 exhibition. This forms the present Paddington station, the first part of which was opened in 1854; the scene of the departure of a broad-gauge express train from Paddington was captured on canvas a few years later by the artist Frith in his well-known picture "The Railway Station," reproductions of which were hung in so many Victorian homes throughout the country. Frith painted this picture twice; the smaller and in many respects the finer copy of the two is in the Royal collection, which the Queen has graciously lent for display at this exhibition. Near it is shown another station painting, one of Penzance, the most westerly point to which Brunel's broad-gauge rails penetrated; this picture by Stanhope Forbes shows the departure of a Great Western Railway express in the nineteen-twenties, painted in the familiar chocolate and cream livery.

Gooch—a Chief Officer

Before the railway reached Cornwall, there was no summer travel to the West Country: the easy access by train and the changing social conditions in the country enabled popular holidays to develop. The Great Western Railway fostered this movement, advertising after the conversion to standard gauge the merits of the "Cornish Riviera," and photographs of famous posters of long ago are exhibited, stressing the similarity of the Continental and Cornish Rivieras. With these attractive posters is shown the carved-wooden pattern from which the nameplate of the *Cornish Riviera Express* is cast: this lovely piece of woodwork is a reminder of the diversity of skill shown in the railway workshops at Swindon. These workshops were established nearly 120 years ago by Gooch, who came to join Brunel at the age of 21 as locomotive engineer and stayed with the G.W.R. until he became chairman of the company; his portrait is exhibited, together with a quotation from his diary which says:

"On September 15, 1859, I lost my oldest and best friend in the death of Brunel. By his death, the greatest of England's engineers was lost, the man of greatest originality of thought and power of execution, bold in his plans but right. The commercial world thought him extravagant, but great things are not done by those who sit down and count the cost of every thought and act. He was a true and sincere friend, and his loss is deeply deplored by all who had the pleasure to know him."

Other Interesting Items

Pictures of the Royal Albert Bridge under construction, together with descriptive panels explaining how the bridge was built; facsimile signatures and notes of the men chiefly responsible for the building of the bridge and of the Cornwall Railway; part of a service of silver gilt plate presented to Brunel by friends of the G.W.R. in 1845, and Gooch's pocket book with drawings of old engines are among other items in a most interesting and informative collection. Most of them come from the records and archives of the former Great Western Railway and were prepared and mounted by British Railways (Western Region).

In addition to civic heads from Plymouth and Cornwall there was a big Western Region representation at the centenary celebrations. This comprised Mr. R. F. Hanks, chairman, and Messrs. A. Chamberlain, P. T. Heady, Sir John Carew Pole, C. W. Rodd and J. Ryan, members of the Western Area Board; Mr. K. W. C. Grand, former general manager of the region and now member of the B.T.C.; Mr. J. R. Hammond, the present general manager, and chief and divisional officers of the region, and Sir Allan Quartermaine, former chief engineer and a past president of the Institution of Civil Engineers.

The R.C.T.S. Tribute

Of the many tributes to the memory of Brunel in this centenary year of his death, none could be more appropriate than that of the Railway Correspondence and Travel Society, which on May 2 (the hundredth anniversary of the opening of the Royal Albert Bridge) ran a special train from Paddington to Saltash to mark the occasion. Elsewhere, along the route of the old South Devon (Continued on page 20)

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A Dennis-bodied Dennis Falcon of the East Kent Road Car Co., Limited, and, right, a prewar Leyland Titan and wartime Guy Arab on local services in Deal



Modified by East Kent for operation as a one-man bus this Dennis Lancet 3 stands beside an A.E.C. Reliance; right, underfloor-engined Lancet with Duple body for express and excursion work at Folkestone bus station



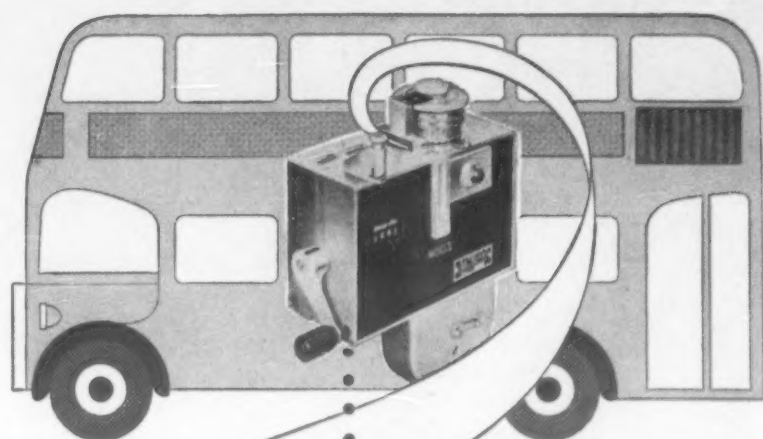
The Canterbury—Stelling Minnis—Folkestone service (18), seen here at Street End, is maintained by one-man A.E.C. Reliances. This has an M.C.W. 41-seat body



New shops in the High Street at Canterbury behind this Park Royal-bodied Guy Arab contrast with the older buildings to the west seen with a prewar Leyland Titan on a city service



Folkestone bus station represents a very great improvement upon previous terminal arrangements. This view includes two East Kent Guy Arab double-deckers and a Maidstone and District Leyland Titan on the joint service 10 to Maidstone



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CENTENARY AT SALTASH

The Cornwall Railway and Royal Albert Bridge (Cont.)*

By C. R. CLINKER, President, Railway and Canal Historical Society

QUITE apart from the Tamar crossing by the Royal Albert Bridge the civil engineering on the Cornwall Railway was a challenge to Brunel. Across its route lay many deep and narrow valleys carrying streams from the moors to the south coast. But the company was obliged to be as economical as possible, so masonry or iron viaducts were out of the question. Brunel solved this major problem by the use of yellow Baltic pine, first-class material which could be bought cheaply and suitably treated against decay by the kyanising process. Two types were built. Across the eight tidal creeks between Devonport and St. Germans, where deposits of mud were up to 70 ft. deep, the decking was carried on timber trusses supported on timber piles, which formed the piers. The usual span was 40 ft., maximum height varying from only 25 ft. at Wiveliscombe to 90 ft. at Keyham; in length they ranged from 400 yd. at Weston Mill to a mere 38 yd. at Grove.

The remaining 34 viaducts between St. Germans

there was now through communication from London to Penzance, 326 miles, although traffic had to be transhipped at Truro until November, 1866, because this westernmost line was of standard gauge. A third rail was then added at 7-ft. gauge and through passenger trains between Paddington and Penzance were run from March 1, 1867.

With further financial help from the associated companies, work on the remaining 12 miles between Truro and Falmouth, which had been suspended in 1854, was resumed in 1861 under R. P. Brereton, formerly one of Brunel's chief assistants. This section included two tunnels and eight of the famous timber viaducts. It was opened for passengers on August 24, 1863, and for goods on October 5, thus completing the Cornwall Railway, which had originated over 20 years before.

Lease and Merger

The financial interest of the associated companies in the Cornwall Railway was now so substantial that it was leased to them in perpetuity from 1859 under a joint committee of management on which the company was represented by four directors. The Cornwall was anything but prosperous. It never paid a dividend on its ordinary capital nor, until the second half of 1881 when the accounts showed a net profit for the first time, did it earn enough to cover that on its preference stock, which had to be made up by the associated companies. By August 1, 1878, the associated companies had ceased to exist, both the Bristol and Exeter and South Devon having amalgamated with the Great Western, which now became sole lessee of the Cornwall Railway. Eleven years later, on July 1, 1889, the company was dissolved and its undertaking merged into the Great Western. The proprietors who held £373,000 of ordinary stock received only £8 for each £20 share, a poor return after many years of struggle and sacrifice.

The improvement in revenue was retarded by the expense of maintaining the timber viaducts which Brunel had warned the directors might cost about £10,000 a year after the first 10 years or so. Replacement of timbers weakened by rot was a difficult and dangerous business if traffic over the viaducts was not to be interrupted. Indeed, this work could only be carried out on those crossing the tidal creeks by suspending the train service or in the long intervals between trains on Sundays. Moreover, distortion was taking place in those situated on curves, and the outward pressure of the trains had to be counteracted by shoring.

Viaduct Replacement

A start with the by now essential reconstruction was made in 1869 by replacing the short Probus viaduct by an embankment. Between 1875 and 1886, 13 viaducts were dealt with; 10 were reconstructed in stone, the new viaducts standing alongside the old and one, Draw Wood, was converted into a retaining wall and embankment. At St. Pinnock, Largin, Liskeard and Coldrennick, the new structures were on the same axis as the originals, the piers being used to carry wrought-iron main girders set outside the old timbers.

Work began again in 1894 (by the Great Western company) and went on for 14 years. The



College Wood Viaduct on the Falmouth branch during construction in 1933 of the stone replacement for the last of Brunel's timber structures

and College Wood, near Falmouth, were over deep valleys or gullies where good foundations were to be had. Here masonry piers, pierced transversely by Gothic-headed openings, were built with centres 60 to 65 ft. apart and carried up to cill level, about 35 ft. below the rails. From the top of these, three sets of diagonally braced struts radiated, supporting the massive beams carrying the decking. These were of greatly varying heights, from 151 ft. at St. Pinnock (between Doublebois and Bodmin Road) and 147 ft. at Moorswater, near Liskeard, to Draw Wood and Penadlake, which were only 42 ft.; the longest was Truro viaduct, 443 yd.

Wooden Cobwebs

Small wonder that these very high and fragile-looking structures inspired superstitious Cornishmen with awe and made them afraid to travel on their new railway. A number of minor accidents did not help to alleviate their fears, though none was caused by, or even affected, Brunel's magnificent series of delicately poised wooden cobwebs. Indeed, there is no recorded instance of accident or failure in the history of the viaducts.

The Cornwall Railway remained a single line west of Devonport, with passing loops at nearly all the stations, until the Great Western converted it from broad gauge to 4 ft. 8½ in. standard gauge in 1892. Doubling of the main line was completed in sections between 1893 and 1908; the only single-track sections now left are the Falmouth branch and across Royal Albert Bridge.

Trial Run

A trial run from Plymouth to Truro by the directors was made on April 11 to confirm that all was now ready for inaugurating the new railway. On Monday, May 2, 1859, H.R.H. the Prince Consort, who had previously consented to giving his name to the bridge, left Windsor by special train at 6.15 a.m. and reached a temporary platform at the Devon end at 12.30 p.m. After the usual loyal addresses the train passed slowly over the immense structure (its vibration causing some uneasiness among the uninitiated members of the party) and reached Saltash, where the Prince alighted and returned on foot over the bridge. His interest in the constructional details still not satisfied, he went below and examined minutely the plans and sub-structure before leaving in the steamer *Vivid* for other engagements.

Brunel, the genius whose greatest railway work it was, did not attend the ceremonial opening of his bridge, being ill abroad; he visited it a few days later, but was still so ill that he had to be drawn across it lying on an open truck. On September 15 he died in London at the early age of 53. His name was later inscribed on the shore archways of the bridge by grateful directors of the Cornwall Railway—"I. K. BRUNEL, ENGINEER, 1859."

Ceremony

The ceremonial opening by Prince Albert was also missed by all the invited guests of the company who had travelled by special train from Truro! This was delayed at Liskeard whilst a fresh engine was obtained and again at St. Germans where the substitute machine broke down. They arrived just as the Prince was embarking and did not see him. However, they were present on the following day (May 3) and travelled on the double-headed special train of 14 coaches which conveyed about 800 guests over the line to Truro where the mayor entertained a select company of 170 to dinner in the council chamber.

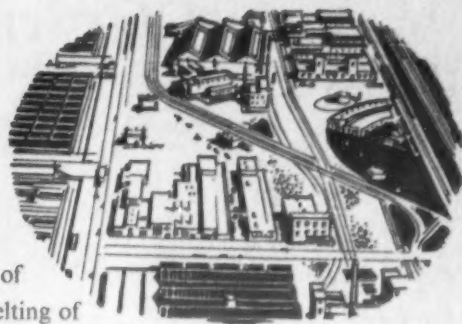
Public passenger traffic began on May 4, but because accommodation at the stations was not ready, goods could not be carried until October 3. The West Cornwall Railway, a separate undertaking, having been opened on August 25, 1852,

final conversions were at Stonehouse Pool and five across creeks between Saltash and St. Germans which were abandoned and replaced by an entirely new line some distance inland; the first portion of this, between Saltash and Wearde, was brought into use on December 31, 1905, and the remainder on March 22, 1908, the sections being worked as a single line until full completion on May 31 that year. Save for Fal, Tregarne, Tregagle, Truro and Carvedras viaducts, between Burngullow and Truro, nearly all the stone used came from the company's lineside quarry at Westwood, near Doublebois; reconstruction was carried out wholly by railway staff in nine cases and partially in five others. The remainder were let to contractors.

Falmouth Branch

On the Truro and Falmouth section, which was really only a branch although originally authorised as part of the Cornwall's main line, the viaducts were not subjected to such heavy loads and replacement of wooden members sufficed until 1922, when a start was made on replacement. All eight were dealt with between 1923 and 1933, the last to go being College Wood. Thus disappeared the last of Brunel's slender and graceful timber viaducts and with them a feature as distinctive of the Cornish landscape as the mine chimneys of the previous century. But Brunel's Royal Albert Bridge remains, an enduring monument to its engineer and the long-forgotten struggle to promote Cornwall's prosperity by a rail link with the rest of the country.

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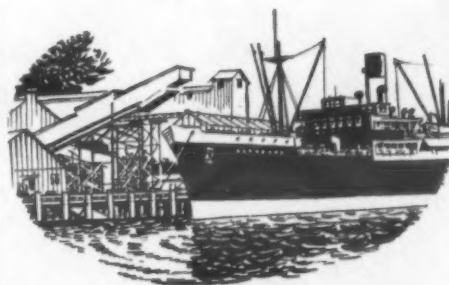
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* Previous portion appeared May 2.

The KARRIER "Gamecock"

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NEWS FROM ALL QUARTERS

Monorail in Seattle

It is reported that the Lockheed Aircraft Corporation is to build a monorail system in Seattle as an operational enterprise.

Train Speed Record Claim

The Illinois Central Railroad streamlined train, City of New Orleans, holds the unique distinction of operating the world's fastest start-to-stop schedule, it is claimed. The record applies to the 53.2 miles between Effingham and Centralia, Ill., which the City of New Orleans covers in 39 min., an average speed of 81.8 m.p.h.

Cheaper Roomettes on C.N.R.

Passengers holding Canadian National Railways coach-class tickets can now enjoy luxury individual room space on a trans-Continental train. The new accommodation, to be known as tourist roomette, is a compact room containing single bed and complete toilet facilities, which in the past has been available only to holders of first-class tickets. The cost is only 30 per cent higher than the present charge for a tourist lower berth.

Police Test Offered to Drivers

Police driving tests for motorists were started at South Shields on May 1. The scheme, believed to be the first of its kind in Britain, is designed to assist the national road safety campaign. Drivers are taken on a severe route around the town with sergeants from the police advanced driving school. "Star driver" windscreen labels are given to drivers who pass the test and the best 12 drivers are to receive awards when the tests end on July 18.

Flyover in Edgware Road

A four-lane flyover to handle traffic at the intersection of Harrow Road with Edgware Road, to serve Marylebone Road, figures in proposals of the London County Council Town Planning Committee put before the full council this week. Parts of the frontages of Edgware Road, Bakerloo and Metropolitan Line stations would be required. The committee reports that the 1951 surface scheme to deal with traffic at this point would no longer suffice. It is also proposed to widen Oxford Street from 75 ft. to 93 ft. overall immediately west of Oxford Circus.

U.T.A. All-Diesel Next Winter?

Harsh economic facts would make unavoidable further closure of uneconomic rail sections, said Lord Glentoran, Minister of Commerce, in the Northern Ireland Parliament last week. The U.T.A., he said, was engaged on a comprehensive review of all sections of the undertaking, which would be required as the basis of the vital decisions that would have to be taken. He understood that the U.T.A. hoped to run the whole of the next winter timetable with diesel trains. Lord Glentoran, who was speaking in the debate on the U.T.A. accounts, pointed out that there were now nearly 30,000 goods vehicles in Northern Ireland, against only half that number when the U.T.A. was established.

L.T. Inquiry Office in the City

London Transport has opened a travel inquiry service in the City of London Information Centre in St. Paul's Churchyard, opposite the cathedral. It is being provided experimentally during the summer months to help visitors.

Lower Rail Rates for Great Lakes

Lower freight rates are proposed by eastern railroads in the U.S.A. to meet competition from deep-draft ocean vessels moving freight through the St. Lawrence Seaway. May 14 has been fixed as the date for public hearings on the proposal. The eastern railroads are worried about the St. Lawrence Seaway because it will permit oceangoing vessels to move freight from Great Lake ports for the first time. They made their first move to meet seaway competition about six weeks ago when they recommended a 20 per cent rate cut on grain exports.

Bumper Year Forecast for British Tourism

More than 360,000 American tourists will visit Britain this year. This forecast was made by Sir Arthur Morse, chairman of the British Travel and Holidays Association, on arrival at Southampton after a 10,000-mile fact-finding tour in North America. His prediction is based on an all-time record increase of 31 per cent in American tourist traffic to Britain in March and on information he gained in talks with American travel agents and transport officials, who reported that bookings for travel to Britain are running well ahead of last year.

Bid for New York Transport Rejected

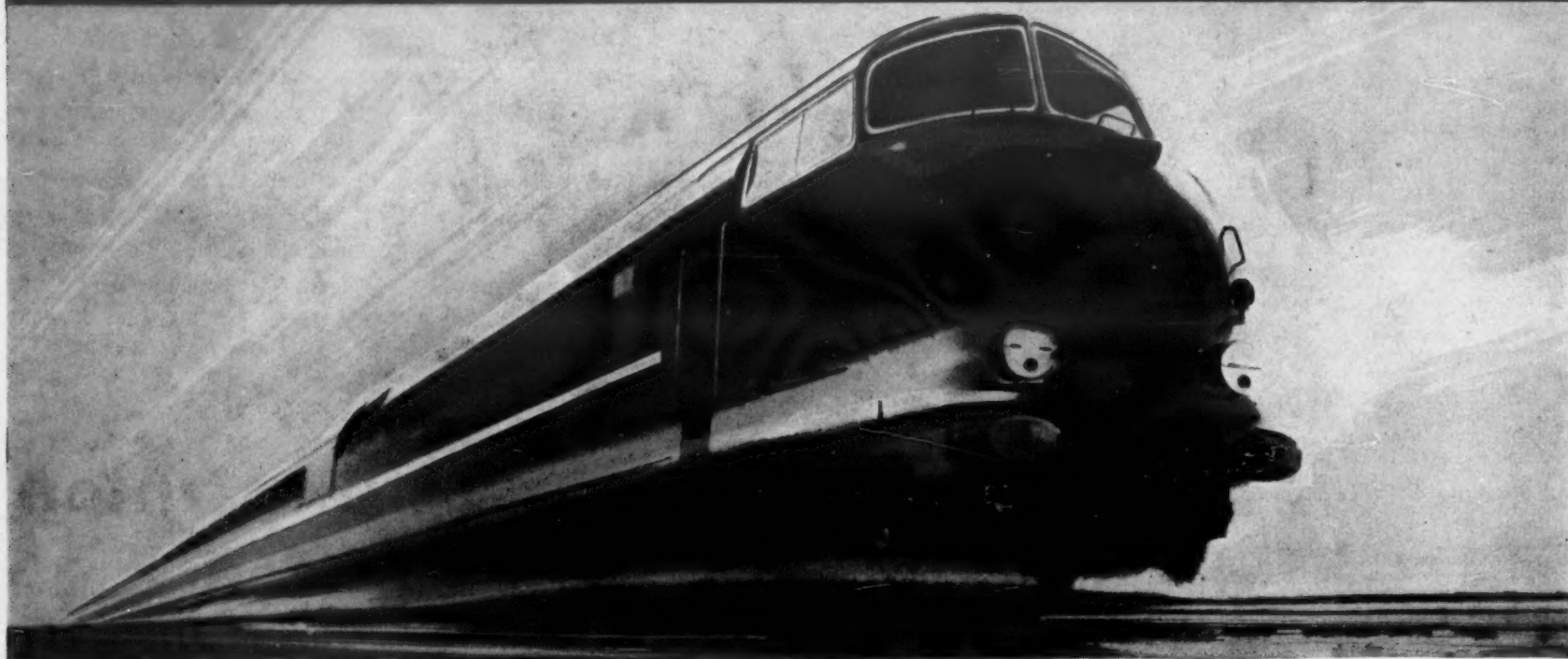
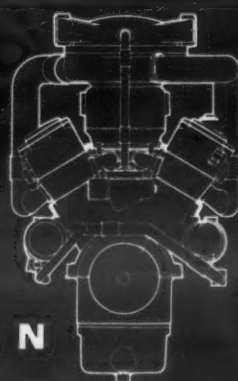
The city of New York has rejected as "fantastic" and "pernicious" an offer by a financier to acquire the New York City Transit Authority system for \$615 million (£261 million), payable by instalments. A committee pointed out that the transport system had cost over \$2,000 million to build, and said it could not be replaced for less than \$6,000 million. It described Mr. Chalk's proposal as "even more pernicious than his original proposal [which set no fixed price] because the city would be paying the amounts necessary to guarantee Mr. Chalk's profit of 6½ per cent, to meet capital requirements, and possibly to meet normal operation costs." The bidder would have proposed fare increases.

Switzerland Builds First Electric T.E.E. Trains

When European railway administrations decided to build the now famous T.E.E. trains in 1955, electrification of the lines concerned was not complete. Diesel traction had to be adopted as a temporary measure. In the meantime, great strides have been made in electrification. Vehicles capable of running on several different electric traction systems, not only in Switzerland (15,000 volts a.c.), but also in Italy (3,000 volts d.c.) and France (25,000 volts a.c. or 1,500 volts d.c.) can now be built. The board of the Swiss Federal Railways has recently ordered five new electric T.E.E. trains of five coaches each (including restaurant car). These trains should be available by 1961 and are intended to create new fast connections between Zurich and Milan and Milan—Lausanne—Paris.

MAYBACH POWER

COMES TO BRITAIN



Bristol Siddeley are now manufacturing under licence a range of diesel engines from 220 to 2,000 bhp rail traction rating developed by the world-famous German firm of Maybach, who have had 35 years' experience in the

manufacture of diesel traction units. Bristol Siddeley Maybach diesel engines are currently being introduced into British Railways Western Region as part of their modernisation programme.

BRISTOL SIDDELEY

Maybach

DIESEL ENGINES

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COMMERCIAL AVIATION

Flying Tiger Expansion

P.L.A. DEVELOPMENTS

MARCH air freight traffic on the Flying Tiger Line set records both for the month and the first quarter of the year, according to Mr. John L. Higgins, vice-president. March traffic revenue reached \$1,239,460, which was 31.8 per cent ahead of the same month last year, when traffic totalled \$940,279, and it was the second highest month in the company records, being exceeded only by the \$1,350,848 for December, 1958. The volume of freight also set a record for the first quarter, totalling \$3,457,696. This was a gain of 39.6 per cent over the comparable quarter last year, when traffic amounted to \$2,475,740. A new freight service including the first nonstop all-cargo flight from San Francisco to New York was inaugurated on May 4. In addition to San Francisco—New York nonstop, the airline started direct overnight service into San Francisco from New York and Chicago. This replaced the service which was routed formerly via Los Angeles.

New Short G.P. Aircraft

Short Brothers and Harland, Limited, Belfast, last week announced the formation of a light aircraft division. The new unit's first project will be a general purpose transport aircraft which is being developed as a private venture. This aircraft will be known as the SC7. It will carry a payload of 1½ tons and will be capable of operating from small airfields. It will operate both as a passenger transport and as a carrier of all types of freight, including motor cars. The preliminary design has been completed and technical details will be announced later.

International Aeradio in Caribbean

International Aeradio, Limited, is supplying six air traffic control officers to the Jamaican Government for the operation of aerodrome and approach control services at the airports of Montego Bay and Palisadoes, and for the area control centre at Kingston. A staff shortage of air traffic controllers has caused a partial close-down of Montego Bay Airport. The positioning of three of the I.A.R.L. controllers was carried out within 10 days, and was essential for the maintenance of the tourist trade in the island. The second three air traffic controllers are to be provided within six weeks.

B.K.S. Terminal at Leeds

The new B.K.S. air terminal at the rear of the Griffin Hotel, Leeds, was opened recently by the Lord Mayor of Leeds, Alderman Mrs. Mary Pearce. Captain C. J. Stevens, managing director of B.K.S. Air Transport, Limited, said that the opening of the terminal was another milestone in the development of air transport in the West Riding. The new B.K.S. services from Yeadon to Rotterdam and Basel would begin shortly, and a new Leeds—Dublin service was awaiting clearance. There had been a doubling of the amount of freight through Yeadon this year so far, and he also hoped that this year would see a 50 per cent increase in air passenger traffic.

U.A.L. Improved Results

The best first quarter in the 33-year history of United Air Lines has been announced by Mr. W. A. Patterson, president of the airline, who reported that net earnings and profit on aircraft sales totalled \$1,851,710. This compared with a loss of \$384,593 in the corresponding period of 1958. The net earnings of \$1,642,431 were augmented by a gain of \$209,279 on sale of aircraft, whereas operations in the first quarter last year resulted in a loss of \$599,964, which was partly offset by a gain of \$215,371 on aircraft sales. Operating revenues in the first three months of 1959 amounted to \$77,818,387, an increase of 18 per cent. Passenger revenues were \$69,095,951, 17 per cent up, while cargo revenues were \$8,001,777, a rise of 28 per cent. Operating expenses totalled \$73,479,416, a 10 per cent increase which was attributed to expansions in ton-mile capacity.

New Services Approved

The Minister of Transport and Civil Aviation, after considering the recommendations of the Air Transport Advisory Council, has approved the operation of the following services:

An inclusive tour service between London (Blackbushe) and Nice; Eagle Aviation, Limited, from May 2, 1959, to October 11, 1959, and for a corresponding period in 1960.

An inclusive tour service between London (Gatwick) and Munich; Transair, Limited, from May 29, 1959, to September 20, 1959, and for corresponding periods in 1960 and 1961.

An inclusive tour service between London (Blackbushe) and Valencia; Eagle Aviation, Limited, from May 1, 1959, to November 1, 1959, and for corresponding periods in 1960 and 1961.

An inclusive tour service between London Airport and Madrid; Hunting-Clan Air Services, Limited, from May 16, 1959, to October 18, 1959, and for corresponding periods in 1960 and 1961.

An inclusive tour service between London Airport and Basel; Hunting-Clan Air Services, Limited, from June 29, 1959, to September 13, 1959, and for a corresponding period in 1960.

An inclusive tour service between Lydd or Gatwick or Manston and Toulouse; Silver City Airways, Limited, from April 25, 1959, to October 18, 1959, and for corresponding periods in 1960 and 1961.

An inclusive tour service between London Airport and Basel; Hunting-Clan Air Services, Limited, from May 1, 1959, to September 27, 1959, and for a corresponding period in 1960.

An inclusive tour service between Southampton and Oporto; B.K.S. Air Transport, Limited, from May 1, 1959, to October 31, 1959, and for corresponding periods in 1960 and 1961.

An inclusive tour service between London Airport and Nice; Hunting-Clan Air Services, Limited, from May 2, 1959, to October 31, 1959, and for a corresponding period in 1960.

An inclusive tour service between London (Blackbushe) and Strasbourg; Eagle Aviation, Limited, from May 23, 1959, to October 4, 1959.

An inclusive tour service between London Airport and Bilbao; Hunting-Clan Air Services, Limited, from May 30, 1959, to September 27, 1959, and for corresponding periods in 1960 and 1961.

P.I.A. and I.A.C. Pooling

Following agreement between Pakistan International Airlines and the Indian Airlines Corporation, a pooling agreement took effect on April 15. Under this P.I.A. provides four flights a week between Karachi and Bombay, two (with rights for a third) between Delhi and Karachi and four between Chittagong and Calcutta with I.A.C. providing three, four and three respectively. P.I.A. has increased Dacca—Lahore to four a week, Dacca—Karachi to 10, all flights being operated by Super Constellations. Viscounts now operate Karachi—Lahore twice instead of once daily, Lahore—Rawalpindi—Peshawar daily in place of a daily DC3 between Lahore and Rawalpindi with four weekly extensions to Peshawar. The supply run Rawalpindi—Gilgit—Skardu is being doubled from 1,000 to 2,000 sorties a year. The only regular DC3 operation remaining in West Pakistan is the service to Kabul.

LONDON TRANSPORT MANAGEMENT



Mr. A. Herbert Grainger

Mr. A. HERBERT GRAINGER

Deputy-chairman of the London Transport Executive since October 1, 1955, Mr. Arthur Herbert Grainger will, as already recorded in MODERN TRANSPORT, take up on July 1 the additional appointment of managing director in which he will be responsible for the day-to-day administration of the undertaking. This will coincide with the assumption of the chairmanship of the L.T.E. by Mr. A. B. B. Valentine upon the retirement of Sir John Elliot. Mr. Grainger was born on May 30, 1899, and was educated at Regent Street Polytechnic. He joined the former Metropolitan Railway in 1913 and served overseas with the Royal Fusiliers in the 1914-18 war, having joined the army at the age of 17½ and being the only member of his draft to come through unscathed. He entered the solicitor's department of the Metropolitan Railway and was articled to the late Mr. Ian Buchanan Pritchard, subsequently qualifying as a solicitor. In 1930 he became an assistant solicitor with responsibility for Parliamentary matters. On the formation of the London Passenger Transport Board, he was appointed an officer as assistant solicitor (general), becoming solicitor (general) in 1937. When Mr. C. G. Page was appointed secretary and chief legal advisor in 1938, Mr. Grainger succeeded him in the conduct of Parliamentary business. From 1943 to 1945 he assisted the late Lord Ashfield on matters of administration and he was appointed solicitor to the London Passenger Transport Board in 1945. He became a full-time member of the London Transport Executive when it came into being on January 1, 1948. He is a member of the Law Society and was president of the Railway Students Association in 1957-58. His elder son, who was a cadet with Thomas Tilling, Limited, and went to Australia some eight years ago, now, at the age of 29, manages a bus business at Warnamboll in New South Wales.

IN PARLIAMENT

Design of Urban Motorways

SHIPBUILDING OUTPUT

M. R. L. T. IREMONGER asked the Minister of Transport whether he was aware that the Royal Institute of British Architects had received an unsatisfactory answer from the West Midlands and West Riding study groups on urban motorways, set up by him, to its representations concerning the desirability of appointing architects to these study groups; and whether he was satisfied that adequate attention would be given in future to the danger of the "Suburbanisation" of increasing areas of the country. MR. HAROLD WATKINSON admitted the facts and said that he fully appreciated the importance of using the best professional advice in this matter. He had written to the chairmen of the two committees suggesting that they might consider associating an architect or planning expert with the work of their committees from an early stage. The committees were local authority committees, and not responsible to him.

Victoria Line

The Minister of Transport, Mr. H. WATKINSON, defended the delay in reaching a decision on the London Transport Victoria Line. He had asked for it to be reviewed impartially by the London Travel Committee, which had promised to report as soon as it had managed to hear all the many people who wanted to give evidence. Mr. Watkinson committed himself to "getting a decision as soon as I can after I have received its report."

Shipbuilding Output

MR. T. G. D. GALBRAITH, Parliamentary Secretary to the Admiralty, told a questioner that approximately 335,000 gross tons of shipping were under construction in British shipyards at March 31 this year; in addition some 905,000 gross tons were on order. The Government was not at all complacent about the state of the shipbuilding industry. He wanted to make the point that "when we have an order book of five million tons and when hardly any orders are being placed throughout the world, it is extremely difficult to get the impetus which a smaller order book or conditions in which orders are being placed throughout the world would encourage." Mr. F. T. WILLEY, who had asked the question, seemed to think that the shipbuilding industry was reducing its output and this trend ought to be reversed.

Quicker Compensation for Land

The Minister of Transport announced the introduction of a scheme for making advance payments of compensation to landowners and tenants whose land is required for the trunk and special roads programme. In the past considerable difficulties and delays have been caused because land has been required to enable road works to proceed well in advance of its being possible to complete the acquisition of the land and pay the appropriate compensation. Under the new scheme any person having a freehold, tenancy, or other interest in land which entitles him to compensation may apply for an advance payment as soon as entry has been taken, or earlier if it is necessary for him to incur expenditure before he can give entry; for example, to buy another house, or put up a new farm building in place of one which has to be demolished. The amount of the advance may be up to 90 per cent of the compensation agreed. If the compensation has not been agreed the advance may be based upon an estimate.

CLACTON ELECTRIFICATION

(Continued from page 5)

will be 75 m.p.h. All the electrical equipment is being supplied by the English Electric Co., Limited. Each set is made up of a battery driving trailer open second coach which also carries on the underframe the batteries, the battery charging and compressor rectifiers and compressor to provide energy for a variety of purposes other than traction; a luggage motor second, on which is mounted the pantograph over the luggage compartment; a trailer composite coach; and a driving trailer coach.

Accommodation

Each set provides accommodation for 19 first-class and 344 second-class passengers. The second-class accommodation is partly in open (saloon) stock and partly in compartments, whereas the first-class passengers are accommodated entirely in compartments. Four toilet compartments are provided in a set. These four-car sets are designed for use in trains consisting of one, two or three sets, the total complement of seated passengers being 363, 726 and 1,089 respectively. In each case there is also room for the same number of standing passengers, thus a three-set or 12-car train would accommodate a total of 2,178 passengers, half being seated and half standing.

All the bogies are fitted with knife-edge suspension to the bolsters carrying the spring gear to ensure as far as possible free and smooth riding qualities. Liners of asbestos material, bonded with synthetic resins, are also fitted to the bogies for sound insulation purposes, together with special rubber reinforcing springs. The floor, sides and roof of all coach bodies are insulated against noise and extremes of heat or cold. The buckeye type of coupling is fitted throughout these trains. This gives not only safe and automatic coupling but also minimises any tendency to telescope in the event of a derailment.

The stock is being built at the British Railways works at York and Doncaster under the supervision of the assistant carriage and wagon engineer, Eastern and North Eastern Regions, Mr. G. H. Taylor. The task is apportioned as follows:

York	112 motor coaches.
	112 driving trailer coaches.
	76 trailer composite coaches.
Doncaster	112 battery driving trailer coaches.
	26 trailer composite coaches.

Conveyancer Fork Trucks, Limited, has been appointed sole distributor at home and overseas of straddle carriers manufactured by Short Brothers and Harland, Limited, in Belfast. This vehicle, hitherto known as the British Straddle Carrier, will in future be known as the Shorland straddle carrier. Conveyancer will assume responsibility for all marketing and selling activities. In addition to this arrangement, the two companies intend to collaborate in the design and further development of straddle carriers as well as other similar mechanical handling equipment.

NEW BUSES FOR EAST KENT ROAD CAR

Front Entrance 72-Seat Double-Decker

THE front-entrance layout in double-deck bus bodies has many advocates and adherents, for reasons which have been put forward frequently, and since the advent of the 30-ft. long high-capacity double-decker, it has offered assistance in overcoming the problem of fares collection and loading control by one man. The front-entrance layout under driver control leaves the conductor free to do his fare-collecting job while loading and unloading proceeds in safety; the minimum of uncollected fares is found to result. An essential of such a layout is, of course, that the staircase and doorway arrangement gives the utmost freedom of passenger flow while causing the least reduction in available seating space—especially when the body is mounted on an ortho-

town services which make up much of the East Kent facilities. The chassis selected was the 18 ft. 7 in. wheelbase A.E.C. Regent Mk. V which, being orthodox, necessitated a basically orthodox body framing, the final structure used following closely the P.R.V. standard for 30-ft. rear-entrance double-deckers.

Framing

A robust steel underframe is used—modified only in so far as the deletion of the rear platform and the substitution of entrance steps is concerned—and the main framing mounted to this has full-length pillars from upper saloon cant to bottom skirt, these being of extruded aluminium alloy flanged box section. Aluminium alloy stress panels,

head centre pillar toward the offside. The front entrance is accommodated in the first bay aft of the bulkhead; it incorporates a pneumatically operated sliding door. The front staircase, of spiral type with the broadest possible steps, is designed to obstruct both saloons as little as possible, and has a useful and accessible luggage space beneath. To guide passenger flow as naturally as possible the stanchion and handpole layout divides the entrance centrally giving two clear gangways, one for lower and one for upper saloon passengers.

Door Control

By offsetting the front bulkhead centre pillar toward the offside and eliminating the nearside window completely—this can be done since the

passenger movement, with wide gangways and well-placed stanchions. The seat frames are Dapta type trimmed in the East Kent scheme in hide and moquette, and the ceiling to seat back stanchions are of the rubber insulated type.

Windows

In each saloon the main side windows—eight lower and 10 upper saloon—have top sliding unit opening portions in Simplastic glazed pans, two extractor vents being also provided both down and up and hinged ventilator windows in the upper saloon front end. Two recirculating heaters in each saloon give added warmth, and in this type of enclosed body they are of real value in winter months in this operating area. The enclosed cab, with sliding doors each side, has an opening screen on the driver's side, and an additional vent at waist level each side. To reduce the engine noise level in the saloon and also to reduce the heat transference the complete bonnet top is covered with a glass-fibre insulated leathercloth blanket, lifting with the bonnet top for engine access.

The interior trim and finishing in both saloons is one of the most attractive and serviceable schemes, into which the patterned East Kent



Exterior of the latest Park Royal vehicle 72-seat bodywork on A.E.C. Regent V chassis; right, an interior view looking to the rear of the lower saloon

dox chassis necessitating the doorway being placed behind the front nearside wheel.

Mr. R. G. James and Mr. S. H. Loxton, general manager and chief engineer respectively of the East Kent Road Car Co., Limited, recently decided, after consideration of all the factors involved in their service requirements, that this feature would offer an improvement over the rear entrance currently in use. It was therefore called for in a recent order on Park Royal for 40 double-deckers of 30-ft. length to operate mainly on the town-to-

waist, vent and cant rails are used, the latter being full length of the upper saloon and forming the basis for the alloy sticks and longitudinals of the roof. The intermediate roofsticks of timber loaded steel section are securely riveted to the main side pillars for a considerable depth.

The structural variations from the standard rear-entrance layout are the omission of the rear bulkhead and enclosing of the rear end, the addition of an emergency exit door in the offside rear of the lower saloon, and the offsetting of the front bulk-

vehicle has a full-front body with enclosed full-width cab—the driver has a clear view of the doorway and the passenger movement. The bottom of the door has a deep window for added safety, and the door control lever is mounted at the driver's nearside above the bonnet top. The whole front end layout was planned in conjunction with East Kent to ensure the approval of its operating staff.

This latest East Kent vehicle seats 72 passengers; 32 are seated down and 40 up and a feature of both saloons is the attention paid to ease of

moquette blends well. The ceilings and coves—those with open lamps on raised patresses, and advertisement mouldings in the lower saloon—are in white enamel to cant level, and a deep red leathercloth is used from cant to seat rail.

Colour Scheme

The two colours are divided by a polished alloy capped wiring channel with red plastic insert, and all stanchions and handrails except the seat back

(Continued on page 20)

The NEW Firestone SUPER MILEAGE LUG

THE DUAL-PURPOSE REAR-WHEEL TRACTION TYRE with all the features you're demanding

POWER BITE TRACTION

Be it on main roads, by-roads, or no roads the Super Mileage Lug tyre's cross grooves, heavy shoulder lugs and circumferential ribbing will combine to give maximum bite and traction and long safe wear. The dual-purpose Super Mileage Lug helps reduce mechanical maintenance too. Many so-called dual-purpose tyres slip and spin causing undue strain on engines and transmissions. But with the POWER BITE

TRACTION of the Super Mileage Lug, this profit-draining problem is practically eliminated.

MORE SKID DEPTH

Deeper non-skid pattern than in ordinary highway tyres gives thousands of miles of sure-footed highway hauling.

SUPER STRENGTH BODY

Super Gum-Dipped, Tension-Dried cords make a really strong, durable body which gives big dividends in tyre mileage and vehicle efficiency.



OUTPULLS AND OUTLASTS any tyre of its kind.

Specially designed for on-and-off-the-road service where a large part of the work is off-the-road and particularly severe.

EXPERIENCE COUNTS 45 Factories throughout the world. Firestone total sales exceed £1,000,000 per day.



CITY TRANSPORT IN BRADFORD

2—Re-equipment of Overhaul Works*

OPERATING FEATURES

FOR the rebodied wartime Karrier trolleybuses mentioned in the first part of this article, 65-seat East Lancashire bodies will be provided; high-tension lighting will be included. The chassis will be equipped with new 8-ft. front axles during their overhaul.

Strip heating is employed in the latest trolleybus bodies. A system of insulated cables is inserted between the inner and outer skins of the bodywork of both saloons, taking current from the overhead—about 3,000 watts per vehicle. This unique system gives a pleasant warmth to passengers, although it raises the temperature by not more than 6 deg. C. over ambient. It has the effect of demisting and defrosting the windows quite effectively and keeps bodywork free from the deleterious consequences of condensation. Insulation tests are made on the heating system at the end of each winter.

Overhaul Works

The principal overhaul works of Bradford City Transport was built in 1915 alongside the Thornbury depot. At that time it dealt with tramcars and a handful of trolleybuses. Under the present general manager the works has been re-equipped and reorganised to meet present-day requirements.

The erstwhile tramway smithy has been cleared and the stores, formerly a fenced-off area in the centre of the shops, has been reconstructed on the site. A valuable feature is the fluorescent lighting of the bins.

While conventional bins are employed for a large number of small parts, all special racks for large stores have been made on a "do-it-yourself" basis from Handy Angle. The latter has also been used for the frame of a sliding door to the stores reception bay; the frame is clothed in aluminium panelling and the door is thus light and easily manipulated. Handy Angle is also used for the construction of various offices and booths, such as the fuel pump shop; it readily accepts a type of glazing bar made for the purpose. The stores offices are, however, of conventional construction, built above the stores on a cantilever from the shop wall. An existing gallery above the stores is to be adapted later as an electrical stores. It formerly housed a belt-driven battery of tramway machine tools.

The Tram Traverser Goes

Another improvement in the works has been the removal of the traverser equipment; the space is filled in with a concrete floor and the only remnant is the turntable carrying 4-ft. gauge tramway track which gives access to the bay where Bradford Corporation tram No. 104 is preserved. This vehicle was rescued by members of the Light Railway Transport League and the Tramway Museum Society from the Odsal cricket ground, where it served as the scoreboard frame, and it was lovingly restored in the last livery adopted for Bradford cars in time for the diamond jubilee celebrations of the undertaking. It can be operated if required off the trolleybus wiring on a section of track remaining in the works approach.

Degreasing baths and rinsing and draining tanks

These are on castors for ease of movement to the job.

The machine tool equipment includes on old tramway lathe brought down from upstairs; it is used on the turning of lengthy articles such as axles and like all the other machines now has an individual drive, a Powalistic coupling being used for the application. A very fine new lathe is by Woodhouse and Mitchell of Brighouse. There is a high-speed Colchester lathe for brasswork, a Town radial arm drill, a Corona vertical drilling machine and a Victoria milling machine. A V-belt drive is also employed on a renovated Buck and Hickman planer. There is a new Jones-Shipman grinder among the tool equipment. All the machine tools are painted in the attractive blue livery of the vehicle fleet.

Better Lighting

A notable alteration to the erstwhile blank wall of the works where the machine shop bay is now placed is the provision of a series of windows to improve lighting. The lower parts of the new glazing have to be frosted because of dwellings close by the works. A useful adjunct to the works is a recently acquired Clark fork-lift truck surplus to American military requirements.

This has a 14-ft. lift and with a crane adaptation can be employed to remove engines from chassis, to move heavy equipment out of pits and other useful tasks.

The air compressors from trolleybuses and A.E.C. Regent buses are fully tested on another item of equipment made for the purpose in the department; needless to say, in such a hilly city great importance is attached to brake efficiency. Incidentally, all vehicles carry a wheel scotch in the cabs for use at terminals. The fuel pump room already mentioned includes the ubiquitous Hartridge injector test bench and a Merlin tool for dealing with pump and injector units. The benches in the pump room, which is well screened from contamination, are topped in Formica. In the woodworking shop a new tool is a Sagar morticing machine.

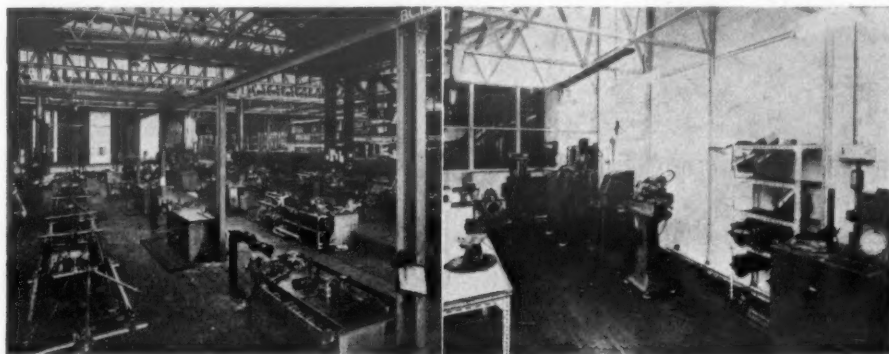
There are 10 pits in the works, each able to take two vehicles in line. Trolleybuses visit Thornbury at 100,000-mile intervals, but motor buses are brought in for a heavy dock at 50,000 miles. Full engine overhauls are being brought up to the 200,000-mile level; garage docks take place at multiples of 6,000 miles, that being a desirable distance between filter changes and injector tests.

Depot Policy

The long tramway history at Bradford has left its mark in the number of depots which are still employed, even though one horse tram depot is now a cinema. Consolidation proposals are now being implemented, but this is necessarily a long-term process and no sweeping decision is in sight. There were eight depots and garages until 1958 when Bolton depot was closed and its 17 trolleybuses transferred to a bay at Thornbury. This had previously been a single-ended relic of tram days and practically unworkable for trolleybus purposes. The difficulty has been overcome by



A former Darlington Corporation Karrier single-deck trolleybus with new East Lancashire 71-seat body



Engine overhaul bay and unit assembly shop at Thornbury works and, right, the fuel pump test room constructed from Handy Angle frames

are among equipment made in the department's own shops, a motor-driven agitator having been also built. The crack detector is another departmental set-up and it has been built with fluorescent strip lighting for ease of operation. A crane, built up from a former overhead wiring pole, has been erected alongside it so that heavy units can be put in place on the crack detector or loaded on to lorries. It serves also the brake drum grinder, since it is arranged that brake drums, as they go on the crack detector, are also gauged for size. Yet a further item built by Corporation staff is a Morris overhead runway down one wall of the building with a block suitable for handling loads up to 5 cwt.

Engine Bay

The works retains two small forges and a power hammer for blacksmith's work, but this is largely connected with overhead line gear. Springs, for example, can be reconditioned more economically by outside contractors. Work benches are all-steel topped, with beneficial results. In the engine bay the erection stands are orthodox proprietary units, but there is a number of tool racks and stands for kits of parts made up from Handy Angle frames.

providing a new doorway from the main shed so enabling vehicles to flow through the bay. A recent item of equipment at Thornbury, which now caters for 112 vehicles, is the provision of a second Februat washer for taking the heavy mud off up to lower deck height in bad weather.

Duckworth Lane is a small trolleybus depot (30 vehicles) adapted from a tram shed; here all vehicles have to reverse out and it has proved impossible to install a washing machine. At Saltaire depot sufficient width has been found to enable the 27 trolleybuses stationed there to flow through and turn at the bottom of the shed. A Februat washing machine with two vertical spindles normally stands separated in two parts; it is placed in position for the wash to be carried out after the morning peak and at the post-midday run-in. It is proposed to replace the Duckworth Lane depot by a new one near the city centre on a site between the Thornton and Duckworth Lane routes (City Road and Sunbridge Road). On this site a gravity run-through could be contrived owing to the slope of the ground.

Bus Garage

The principal motor bus garage is Ludlam Street, an establishment specially built for the purpose.

(Continued on page 16)

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**"Assure me, dearest Matilda,
it was all an evil dream"**

"Oh villainy most vile!" With this wild eldritch cry Egbert started from his pillows. Matilda, hurrying to his side, pleaded with him to disclose the cause of such piteous perturbation.

At length, with many a sigh and groan, Egbert gasped, "Driving upon a dark and lonely road, I was of a sudden set upon by footpads and thieves who seized me, hurled me viciously into the roadway and drove off with joyous laughter, mindless of my plight. Even now those dastardly wights are reaping the fruits of

my labours, enjoying my engine's surging power as it makes mock of the direst hill, burning away my precious fluid!"* Overcome with anguish, he could say no more. "Courage, my brave Egbert!" Matilda resolutely entreated him. "You are here, in your own bed, Egbert. You have but dreamt this calamity."

Hope battled with despair in Egbert's face. Clutching her hand in his troubled grasp, he breathed, "Assure me yet again, dearest Matilda, assure me it was all an evil dream."



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City Transport in Bradford

(Continued from page 15)

pose but which can house under cover only about 75 of the 100 vehicles allocated to it. An Essex bus washer is provided on an exit; buses on the run-in are refuelled, go out of the garage through the wash and enter again for parking. An interesting feature is the use of gas to warm air which is ducted all over the garage. By building an upper floor over the inspector's office and small canteen it has been possible here in the last two years to provide a very attractive canteen for bus crews with an adequate kitchen and to give room below for a paying-in room and other necessities. The

A subshed to Ludlam Street is the motor bus garage at Bankfoot, the erstwhile main depot of the Bradford and Shelf Tramways. Built on two levels originally, this has been modified so that pit accommodation between tramtracks for one bus length is all that can be reached from the upper level. The rest of the upper section has been cut down 5 ft. so that a reasonable parking and shunting area for 30 buses can be given entry from the lower door. This sub-garage is under a charge-hand. Washing and all major mechanical matters are dealt with at Ludlam Street. Another bus



A B.U.T. trolleybus on the 1 in 9½ Church Bank gradient with Bradford Cathedral in the background; right, new machine tools in the overhaul bay at Thornbury



do-it-yourself principle extends here to provision of a home-built night safe. Incidentally a paying-in office and canteen has just been provided in Thornton Road near the city centre, for crews taking meal breaks. The scheduling of meal breaks in all duties has practically eliminated that enemy of busmen, the gastric ulcer.

garage—for only 23 vehicles—is at Horton Bank Top, another relic of steam tram operation.

Trolleybus Training

At Bowling is a garage for 42 buses (25 under cover and 17 outside) and near at hand is a former permanent way depot which deals with pole preparation and is also the site of a ramp (built where the inclination of the ground favoured it) for cleaning bus and trolleybus chassis by steam jenny. As the yard was wired for trolleybuses so that they could use the steam cleaner a complete circle was made and learner drivers (drawn from conductors) are there trained in the handling of trolleybuses, following the overhead, smooth operation of the controller, and so on before being allowed on the highway. Incidentally, motor bus drivers are normally recruited from trolleybus drivers at Bradford.

There are still seven depots in Bradford and as mentioned previously a plan will soon be evolved to reduce these to five. It is intended to enlarge Ludlam Street by the purchase of surrounding property; to enlarge Bankfoot by the inclusion of land already belonging to the Department; to close Horton, Duckworth Lane and Bowling depots and to construct a new trolleybus depot on the City Road site.

A feature of all the garages is the provision of a lorry which is always ready loaded with grit. The department then takes the responsibility of gritting all roads it uses in cases of frost, ice, and snow. These nine vehicles have the rear wheels fitted with chains permanently. Two A.E.C. Matador four-by-four recovery vehicles are also in the fleet. One is stationed at Ludlam Street and the other at Thornbury.

Features of Operation

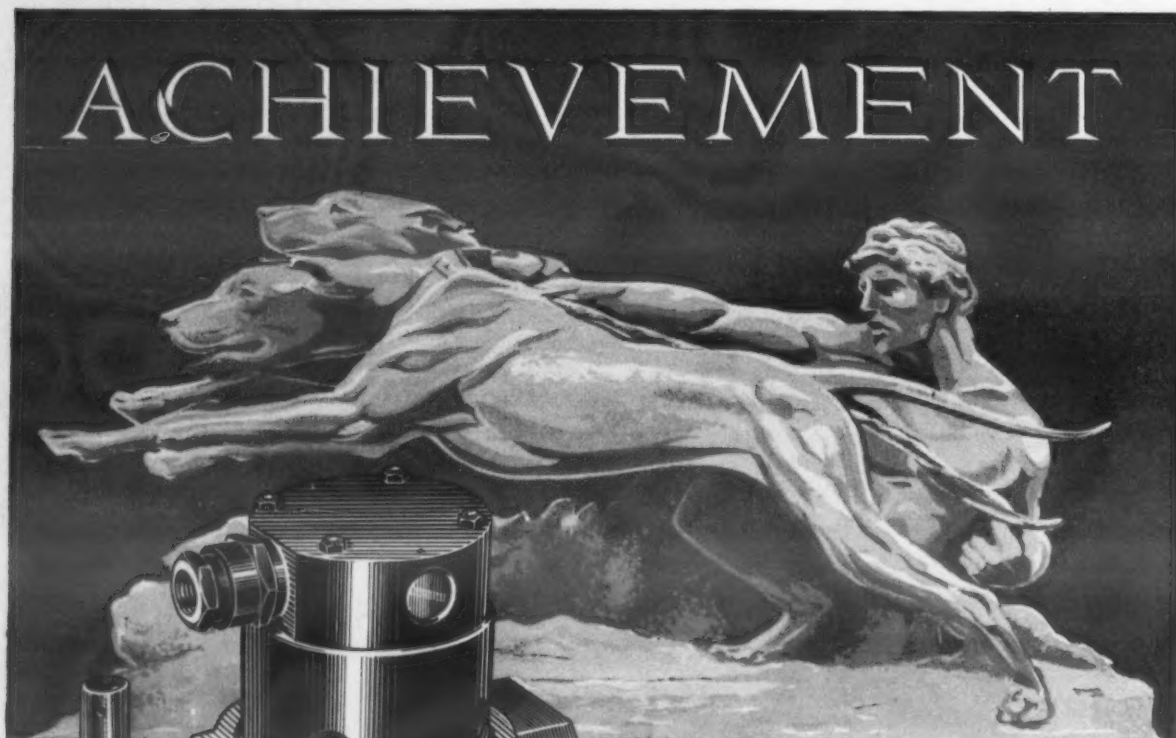
Surrounded as it is by the operations of area agreement bus companies that entrenched themselves when municipalities were engrossed in local tramway operation (West Yorkshire to the north, Hebble around Halifax, Yorkshire Woollen District and West Riding Automobile southwards) there is comparatively little through running by Bradford Corporation vehicles. On the West Riding Automobile route south-eastward towards Wakefield Bradford assists by operating beyond its old-established out-of-boundary terminus at Drighlington to Adwalton every 30 min. in the peak.

There is joint operation with Huddersfield Corporation and Hebble Motor Services on the through route, every 15 min. from 5.15 a.m. to 11 p.m., to Brighouse and Huddersfield. A minimum fare of 6d. applies on outward journeys to Wyke School. A joint service is provided with Yorkshire Woollen District to Dewsbury at up to 15-min. intervals and on this interavailability is given with tickets issued by Yorkshire Traction and the Sheffield Corporation and Railways Joint Committee. There is a joint service with Leeds City Transport to Leeds, Infirmary Street. This has suffered through diesel railcar competition at bus fares on the railway and now drops from a 10 min. evening peak headway to half-hourly. Joint services proposed many years ago with Keighley did not proceed beyond the planning stage and in 1932 Keighley Corporation transferred its undertaking to Keighley—West Yorkshire Services, Limited, a unique case in Britain of the Continental "compagnie-mixte." At Queensbury, the Bradford buses terminate at the same point as the Halifax Corporation vehicles.

Close Headway City Services

Turning to services in the city, the original trolleybus service, now extended to run from Red Lion Hotel, Bankfoot, to Bolton Junction, attains a 6-min. headway in the evening peak in conjunction with the City Circle motor bus route No. 50. The joint trolleybus routes to St. Enoch's Road Top make a 2½-min. service in the peaks. Bradford Moor has a 5-min. peak service and the Thornbury route a 3-min. headway. Joint motor bus services on the road to Odsal total 28 or more an hour. There are considerable reductions in the off-peak, one of the most notable being on the Woodside estate, where the 10-min. peak service drops down to a 45-min. interval from 12.10 p.m. to 3.55 p.m. and again after 6.25 p.m. from Town Hall Street, and there is no morning service from 8.23 a.m. until just after midday. Buses on the Shelf service pass near at hand, of course.

A feature is made of mealtime extras on various services, all of which are closely adjusted to the traffic presenting itself. Of recent years a useful series of cross-city facilities has been given, basic trolleybus headways being put through from Bradford Moor on the east to Saltaire on the north, with projections to Bingley and a recent innovation from Eccleshill (N.E.) to St. Enoch's Road Top (S.W.), for example. Through buses are run from Brighouse (south) to Wrose (north-east) or from Greengates (north-east) to Haworth Road (north-west) from Fagley (W) and Wrose (N.E.) to Moore Avenue (S.W.) across the city centre, with benefits to schedules efficiency as well as to the public.



"Hounds in Leash." After the sculpture by Harry Bates



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AP 891

TRANSPORT IN EAST AFRICA

Higher Traffic—Lower Expenses

RATE REDUCTIONS TO MEET COMPETITION

IN presenting the East African Railways and Harbours report for 1958 Major-General W. D. A. Williams, Commissioner for Transport, states that trading conditions in East Africa remained generally static throughout the year and there was no marked change in the transport pattern as a whole; general exports showed an encouraging increase of 10 per cent but imports continued to decline by a still larger percentage. The year had shown two very encouraging developments: on the one hand operational economies, which had done so much to restore the unfavourable position of 1957 and, on the other, change in emphasis in present development policy, which is now towards long-haul facilities at once advantageous to the internal economic expansion of the Territories and to the revenue of the Administration. As a result of stringent economy working expenditure had for the first time shown a reduction on the previous year and there had been an

export requirements over the next few years. In the case of railways . . . it has been found necessary to make fairly substantial alterations in the £8½ million loan programme. The original programme provided for new locomotives and rolling stock and general improvements to all services. The requirement in respect of locomotives—related to the purchase of new diesel power—remains virtually unaltered, but in respect of general improvements, which accounted for nearly half the total programme, it has been found necessary to make a considerable change in emphasis on what are the most important requirements.

New Railways

The amount of capital released by this revision of the loan programme will be used in the main to build two new railway lines: (a) a 44-mile branch line from Kilosa on the Tanganyika Central Line to Mikumi to reduce the cost of transport to and from



A 59 Class Beyer-Garratt between Limuru and Kikuyu on one of the thrice-daily caboose trains between Nakuru and Mombasa. These were introduced by East African Railways and Harbours in 1958 to reduce freight transit times and the trains operate on a flat load of 1,200 tons in the up direction and with a maximum load of 1,280 tons in 80 units in the down direction

improvement of no less than 6 per cent in the operating ratio. Increased road competition had led to agreement to narrow the differential tariff as from January 1, 1959.

More Traffic at Less Cost

In his report Mr. J. R. Farquharson, the general manager, states that the main achievement of the year was to have carried heavier goods traffic while reducing working expenditure. The combined revenue amounted to £23.4 million, an increase of £1.1 million over 1957. Harbour revenue fell by £106,000, or 2 per cent, because of small imports, whilst railway revenue (3,400 route-miles) increased by £1.2 million, or 7 per cent, this being approximately the sum expected from the higher rates and charges introduced on October 1, 1957. A larger proportion of low-rated traffic was carried and the higher ton-mileage did not have a proportional effect in increasing revenue. Net earnings for railways and harbours (£3.8 million) were 50 per cent more than in 1957 and yielded a return of 3.8 per cent on total capital expenditure. The improvement in the railway operating ratio (from 90 to 84 per cent) was brought about by economies and increased charges.

Money for Development

The acute net revenue position, coupled with the general financial stringency, is stated to have had a retarding effect on the development programme. About £12 million has to be found over the next two years, some of which can no doubt be provided by short-term loans and possibly by betterment contributions; but it is pointed out that unless the present programme is to be further curtailed—which might have serious repercussions on the ability to carry the expected higher volume of traffic—it will be essential to borrow £10 million of the total by way of long-term loans raised in London or elsewhere—an oft-recurring problem. Meanwhile, the £225,000 contribution (to Betterment Fund) of 1956, the small £50,000 total of 1957, and the contributions totalling £100,000 in 1958, compare most unfavourably with the average of more than £1 million annually contributed over the period 1949 to 1955; if the administration had been able to maintain contributions to betterment funds on their previous scale, the problem of financing the present development programme would have been greatly simplified. "No transport organisation, if it is to meet the changing needs of its users, can function effectively unless it can earn a significant surplus to finance improvements," states the report.

Capital Account

Expenditure on new equipment, new works and renewals of existing assets was £5 million compared with £7 million in 1957. Expenditure on renewals was approximately the same as in the previous year (£1.6 million), but expenditure on capital works was only £3.2 million, against £5.1 million. Capital development during 1959 and 1960 is mainly related to the £8½ million loan programme approved by the Central Legislative Assembly at the end of 1957. This programme provided, in respect of harbours, for the completion of the deep-water quay walls at Kipevu, Mombasa, the rebuilding of two transit sheds at Mombasa, improvements to passenger facilities, and the construction of a back-of-the-port shed at Dar es Salaam. This schedule of works is considered sufficient to cater for the probable import and

the Southern Highlands and to retain traffic on the railway and railway road services; and (b) a cut-off in Uganda between Bukote (near Nsinze) and Jinja, which will substantially reduce operating costs over this section of line.

Two further projects still in the planning stage are: (a) an extension of the Tororo—Soroti line as far as Gulu with a view to improving the services to Lango, Acholi and West Nile; and (b) a connection between the Tanganyika Central Line and the Tanga and Kenya and Uganda lines, regarded as "possibly the most important missing link in the chain of rail communications within East Africa."

Road Competition

The report asserts that the railways' ability to survive in competition with road transport depends not only on their catering for long-haul movements but also on ensuring that charges and standards of service are competitive. As regards passengers, the third-class rail fares in East Africa, based on 6 cents a mile for the first 100 miles and 4½ cents a mile thereafter, are competitive, but with goods traffic the railways, with their traditional differential tariff charging for goods according to value, are proving vulnerable to road competition. At the end of 1957 the loss of goods traffic to road hauliers was estimated to be costing the railways £600,000 per annum; a later review in 1958 indicated that this loss was increasing rapidly and was then more than £800,000 per annum.

Although the administration realises its duty to assist the production and export of primary agricultural, mining and industrial products and raw materials by way of low rates, its ability to do so has been severely restricted by recent losses of high-rated traffic, and unless much of this returns to rail, there will probably be little alternative to making a further tariff revision. The new tariff still provides for rates as low as 11 cents a ton-mile on some agricultural produce, which is considerably less than the average cost of 18.6 cents a ton-mile. Protection through road transport licensing, it is stated, remains essential if the railways are to continue to fulfil their statutory duty to give low rates for the carriage of primary products.

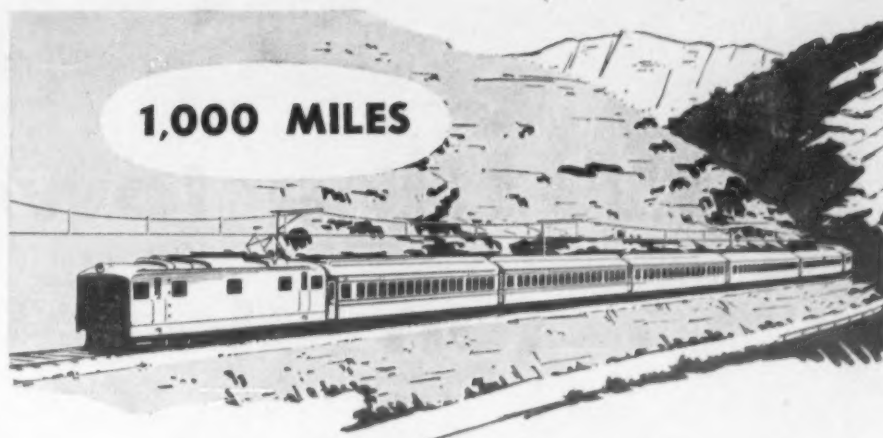
Road Vehicle Licensing

The report points out that in Uganda there is no licensing of goods-carrying vehicles. Tanganyika has recently introduced licensing, and although Kenya has operated a licensing system for many years there is active competition on many routes; the legislation is currently being reviewed. Whereas, it is stated, the E.A.R. and H. has to raise revenue to meet its full costs, there is no assurance that in each territory road users as a whole meet all the costs of providing and maintaining roads nor that goods vehicles make an adequate contribution to road costs.

A fair proportion of the competition is said to come from the operator who, when not engaged in normal short-distance crop movements, transfers his vehicles to routes competitive with the railway where good loading can be obtained. With vehicles of better design becoming available, and with improved roads throughout East Africa, competition intensified in recent years and it became increasingly clear that the traditional tariff structure could not be maintained in its existing form without further serious diversion of traffic (Continued on page 20)



An Albion 5-ton lorry used by E.A.R. and H. on road freight services between Kenya and Tanganyika



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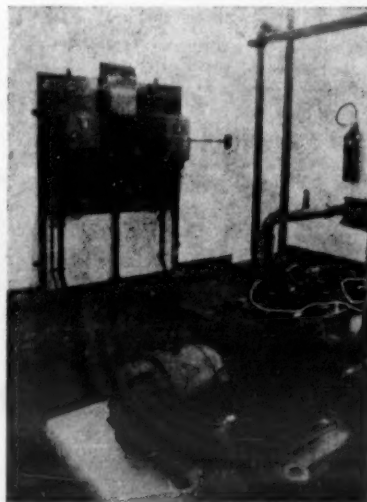
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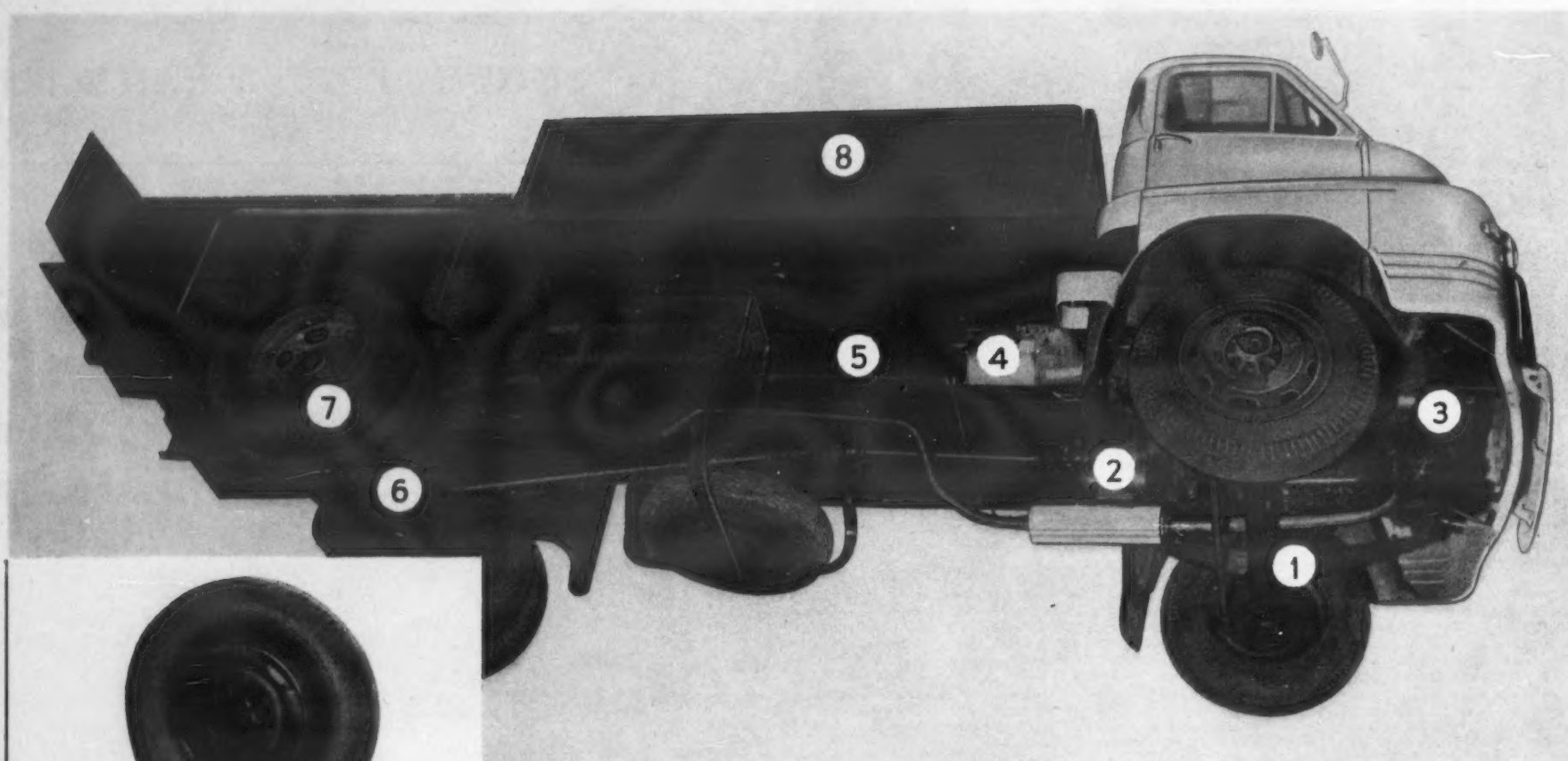
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EDINBURGH SINGLE-DECKERS

Solid Rivets and Outside Stress Skin

AS we recorded in our issue for January 17, Edinburgh Corporation Transport Department has adopted a form of construction for 50 new single-deck buses employing external stress skin panels solid-riveted to the body framing, a method common in America and on the Continent but little used in this country for passenger vehicles. In order to test this type of construction fully before the present order was placed, Edinburgh

able for release, except that M.C.W. patented metal construction with solid-riveted outside stress skin panels is used and that front and rear domes are of reinforced plastics, the rear dome being lined with solid p.v.c. There is a full-length partition, glazed to waist level, behind the driver and a safety feature is that the control for the front air-operated doors, which are each glazed to floor level with a single glass panel, is incorporated in the



One of 50 44-seat M.C.W. buses of solid-riveted construction on Leyland Tiger Cub chassis for Edinburgh Corporation



Interior view from the front platform and (right) the driving compartment, with Pneumo-Cyclic gearbox control clearly to be seen

Corporation has had one vehicle with a similar type of bodywork in service for seven years and has proved it to be robust, reliable and extremely easy to maintain.

Based on Leyland Tiger Cub

The 50 new vehicles are 44-seat 30 ft. by 8 ft. single-deckers developed by Metropolitan-Cammell-Weymann, Limited, based on Leyland Tiger Cub chassis. The chassis too are to Edinburgh's specific requirements, having the O375 Leyland diesel engine of 110 b.h.p., which was developed from the O350 unit to power the recently introduced Super Comet goods chassis, automatic friction clutch and semi-automatic four-speed Pneumo-Cyclic gearbox. The chassis also have 24-point automatic lubrication.

Details of the body structure are not yet avail-

Pneumo-Cyclic gear lever, so that doors are automatically held closed while the vehicle is in motion. There is also a half partition on the driver's left and provision for fitting a driving compartment door should this be necessary for one-man operation.

Each of the 10 side windows has a special type of draught-free deflector ventilator at the top and there is a large ventilation unit with opal-coloured substitute glass in the roof towards the rear. Seats have foam rubber cushions trimmed with leather and tubular seat frames have stainless-steel top rails. All seats face forward and although the theoretical capacity is 45, seats are limited to 44, a single seat being fitted at the nearside front to assist circulation near the door. The rear seat is hinged for access to the N.I.F.E. batteries and there is a continuous bell contact strip fitted along the ceiling towards the nearside.

Rayon or Nylon?

RESULTS OF LATEST SERIES OF TESTS

PROFONTS of nylon and rayon as tyre-reinforcing cords have been engaged in rival promotional campaigns, particularly in North America, for some months and the results of the latest series of tests instituted by the rayon interests appear to indicate that at the present stage of development the older-established material is more than holding its own. But nylon might well be capable of further dramatic development to improve its suitability for tyre-cord material and in any case its one great advantage of low specific weight is unlikely to be challenged by a viscose material, ensuring for nylon a permanent place in aircraft tyre production and indeed also in tyres for surface vehicles when weight is a prime consideration.

High-tenacity viscous rayon was developed by Courtaulds, Limited, in the 1930s and was introduced to the tyre industry under the name Tenasco in 1936. Its strength and light weight made it an ideal tyre carcass material and it quickly began to replace cotton in tyre production. The manufacturing process was licensed to overseas rayon producers and evidence of the growth of its use is given in figures for world production of rayon tyre cord which from 10,000,000 lb. in 1939 rose to 752,000,000 lb. in 1955. Growth was undoubtedly accelerated by wartime conditions.

Development of Tyrex

The original Tenasco cord had a dry breaking load of 23 lb. and the ability to vary the properties of the material during manufacture was exploited to the full by Courtaulds which followed the early cord with Tenasco 35 (breaking load 28 lb.) in 1955, Tenasco Super 70 (31 lb.) in 1957 and Tenasco Super 105 (35 lb.) in 1957. All these yarns are now in use for tyre production and because of their superiority for this purpose the higher grades have been given the name Tyrex. That finality in development has not yet been reached is indicated by the fact that the latest experimental yarn has a breaking load of 40 lb. without sacrifice of other essential qualities.

This 75 per cent increase in strength has important practical advantages in that by its use a tyre of equal weight will possess much greater strength or alternatively a tyre of equal strength will be substantially lighter in weight. Tenasco Super 105 was first made available in experimental quantities to British tyre companies at the end of 1956 and its counterparts in North America to American and Canadian tyre manufacturers in 1957.

Among the other properties essential in a tyre

cord is extensibility under load. It is comparatively easy to produce stronger cellulose filaments than those currently in use but simple increase in strength is generally accompanied by lower extensibility, giving increased brittleness and poor resistance to abrasion. The true success of the Courtaulds work lies in the fact that the progressive increases in strength have been accompanied by increases also in extensibility.

On the other hand extensibility must not be too great or a tyre will tend to flex too much under load (and possibly distort with very high speed) leading to more rapid tread wear and the generation of excessively high temperatures. One of the less desirable features of nylon is its comparatively high extensibility. This leads to the consideration of the effects of high temperature on the characteristics of a tyre cord. Taking comparable cords of Tyrex and nylon it is claimed that the rate of loss of strength of nylon is greater than that of rayon between 50 and 150 deg. C.—the normal operating range, while under extreme temperature nylon melts at 250 deg. C., at which point Tyrex still retains 55 per cent of its original strength.

The Tests

Realising that laboratory tests cannot take the place of practical field trials, the rayon manufacturers instituted a series of practical tests designed to substantiate their claims for the superiority of Tyrex. For various reasons, economic, geographic and climatic, it was decided that the tests should be conducted in North America, where they were organised by the American Rayon Institute in conjunction with Courtaulds (Canada), Limited, and conducted through impartial research agencies. The tests were of four kinds—high-speed tests on cars run at speeds up to 120 m.p.h.; off-road impact tests on overloaded station wagons over rough desert track; commercial vehicle tyre tests run on overloaded articulated lorries at speeds around 50 m.p.h.; and on day-to-day running on a large number of New York taxis. The last-named test is still proceeding.

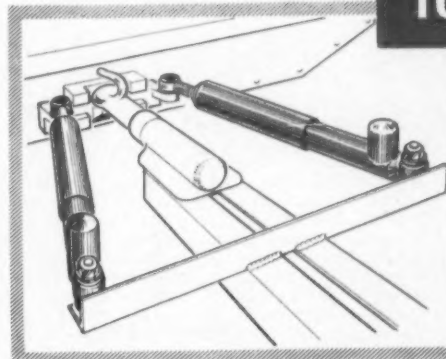
In each case the test has been of the relative performance of comparable grades of nylon and Tyrex in tyres that were otherwise identical, in some cases these having been specially manufactured to ensure that rubber compounds and processes used in manufacture would not give misleading results. In summary it is said that the Tyrex-cord tyres gave an average of 20 per cent greater tread life and 30 per cent better impact, or

(Continued on page 20)



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TRADERS' VEHICLE PROBLEMS

13th T.R.T.A. Annual Dinner

A RECORD attendance was secured for the thirteenth annual dinner of the Traders' Road Transport Association on May 4; it was presided over by Mr. S. C. Bond, president, T.R.T.A., who was supported by a distinguished top table. Proposing "Her Majesty's Ministers," Lord Mancroft reminded his hearers that it was not long since he had been at the receiving end of such toasts. Now he was turned shopkeeper and was a member of the T.R.T.A.; his shop owned 8,000 vehicles which travelled 85 million miles a year. He looked forward to the motorway era and hoped that they would be planted with trees. "Let Arboreal Nugent go down with Capability Brown," he declared. Because all decisions in transport gave offence to someone, he hoped the Minister would never compromise and so achieve nothing. Lord Goddard had attacked the mad dogs who motored too fast; he would advocate attacking the old motorists who went too slow. The Minister must not be fearful of causing offence in going for the reduction of accidents. Too many drivers were a potential accident looking for somewhere to happen. But exasperation was the cause of most accidents and that was the justification for getting rid of parked vehicles and improving the road system.

Co-operation

In reply, Mr. G. R. H. Nugent, Parliamentary Secretary, Ministry of Transport, expressed appreciation of the co-operation between the T.R.T.A. and the Ministry, as in the "Kerb Space is Precious" campaign. They had started parking meter schemes to make proper use of street space in cities. Traffic engineering would help them and the amenities would be preserved on the motorways. The towns were going to stay roughly as they were now and if there were double the number of vehicles in the next decade, regulation must develop to get traffic moving and trade preserved, but regulations that limited the commercial scope of his audience could not be the way to do anything.

In proposing "The Guests," Mr. S. C. Bond urged more attention to urban arteries in the large cities and towns. The T.R.T.A. regarded that as almost more important than trunk road development. What good would it serve to be

able to transport goods faster between cities if by that very fact confusion was made worse confounded when the vehicles arrived? One thing might be to make it compulsory for all new buildings in urban areas to provide a certain amount of off-street parking for private cars, for it was an undeniable fact that a very large part of present-day congestion was caused by the long-term parking of private cars. Parking meters were only a palliative. Some satisfactory results had already been observed from the "Kerb Space is Precious" campaign, but its success could be only limited against the main background of the problem. Some more radical solution would have to be found other than in the placing of restrictions upon the loading and unloading of commercial goods vehicles.

Effect of "Do-it-Yourself" Transport

Major-General G. N. Russell, chairman of British Road Services and president of the Institute of Transport, who responded, said that many of them were members of the Institute and dealt with a wide range of mutual problems in road development, speed limits of vehicles, congestion in towns, and the rising tide of parking meters. It was essential that the public transport services should be maintained efficiently. Nevertheless, the unrestricted growth of "do-it-yourself" vehicles was bound to have a reflection on the providers of public transport, whether the State or private owners. Every extra lorry on the road meant someone else's coming off, because vehicles had increased in numbers, while productivity remained the same. He thought the attention of the T.R.T.A. should be directed to what was going on. As to road safety—if they were to do their business properly on the roads, they must have better discipline and reasonable observation of speed limits.

The Council for Scientific and Industrial Research announces that the Mechanical Engineering Research Laboratory at East Kilbride, near Glasgow, has been renamed the National Engineering Laboratory in order to emphasise the national character of the laboratory. It does not imply any change in the field covered by the laboratory. The council has also decided to set up a steering committee to look after the laboratory programme.

NEW EAST KENT BUS

(Continued from page 14)

stanchions are plastics and covered in matching deep red. Kicking panels of polished fluted aluminium are fitted round the stairwell fender, the upper saloon front end from the waist down is similarly faced, as are the rear seat boxes in both saloons and the wheelarch seat risers in the lower deck. The exterior scheme is the well-known East Kent livery of deep red and cream, and a feature is the revised destination and route indicator layout



Front entrance and stairs of the new East Kent double-deck bus

both front and rear. Flashing trafficators front and rear are fitted, and a cyclists' rubbing rail of polished alloy trims the rear end skirt.

As an example of Park Royal bodywork tailored to the specific needs of an operator, these bodies reflect the care taken in this respect by the body-builder, and further, show the insistence of East Kent on the recognition of operational and passenger requirements in the initial design of its bodies.

RAYON OR NYLON?

(Continued from page 19)

bruise-break, strength. The nature of the tests and some of the results are illustrated in a new colour film just received by Courtaulds, Limited, from America.

The commercial tests, which were run in Texas in ambient temperatures ranging from 69 to 101 deg. F. and with road temperatures from 112 to 139 deg. F. were particularly severe. Of eight original Tyrex-cord tyres used, six completed the tests in good condition while of the eight comparable nylon tyres used, only one was still serviceable at the conclusion of the tests.

With such conclusive proof of the strength and durability of tyres constructed of Tyrex there is little reason to suppose that there will be any great change in the present position. This is reflected in the fact that Tyrex is now the basis of practically 100 per cent of all original equipment tyres used in the American car industry, a high proportion of those in the commercial vehicle industry and a majority share of the replacement market. The Russians also appear to have read the signs and placed a £15 million order with Courtaulds last week to supply factories for producing viscose fibres, part of which will be for the manufacture of Tyrex tyre cords.

SALTASH AND BRUNEL

(Continued from page 8)

Railway the scene of his "atmospheric fiasco"—the derelict stationary engine house at Starcross still stands as a curious monument to failure, whilst beyond Newton Abbot the great banks at Rattery, Dainton, and Hemerdon evidence the faith he had in the bill-climbing powers of the atmospheric system.

At Plymouth the opportunity was taken to see something of the large-scale rearrangements now in hand, which will bring the local railway system into line with modern requirements. Antiquarian pleasures were catered for by a truly vintage train comprising a 70-year-old Adams 0-4-4 tank and an ex-L.S.W.R. gate-type push-and-pull set which conveyed the visitors over the Turnchapel branch, closed to passenger traffic since 1951. Returning to Plymouth, the tour was resumed over the 6½-mile ex-G.W.R. branch to Yealmpton. For much of its length this line runs alongside the broad, gloriously wooded estuary of the River Yealm. Most fittingly, the return journey from Plymouth to Paddington was made behind 5069, *Isambard Kingdom Brunel*, a splendid engine which in itself epitomised the great tradition that Brunel so ably helped to found.

TRANSPORT IN EAST AFRICA

(Continued from page 17)

from rail. A number of special rates was therefore introduced during the year together with a major revision of the railway tariff which narrowed the differentials between the higher and lower rates.

Rate Reductions

As from January 1, 1959, the maximum rate on the rail and inland marine services was reduced to 40 cents a ton-mile and, with certain exceptions, the lower class rates were increased by 5 per cent. On the basis of present traffic it was estimated that revenue from the new tariff would be some £100,000 less per annum; its success therefore depends upon its ability to bring back traffic lost to road. It represents the first general reduction in charges during the postwar period. A further step to make the railways more competitive was to seek relaxation of the law governing publication of rates and charges. As a result special rates can now be quoted without prior publication; but subsequent publication is still necessary, and the standard class rates as already shown in the tariff book remain the maxima and are likely to remain the basis for the greater volume of goods carried.

THE TROLLEYBUS

(Continued from page 3)

While these experiments were going on the Schiemann system was gaining ground in many parts of Germany, there being seven lines in operation by 1910. Some of these, such as the Wurzen in Saxony, opened in 1905, were for goods traffic only. A well-known photograph shows the trolleybus towing a line of three wooden trucks with heavy wooden wheels. Many of the early vehicles had steel tyres on the rear wheels and solid rubber tyres on the front wheels, which were often smaller in diameter. The state of the roads was such that dust sheets often had to be added to protect the passengers, while dust getting into the motors was a frequent cause of breakdowns. This was a particular weakness of the Cedes-Stoll system, although for a while it was a serious rival to the Schiemann system. Most systems followed the tramway pattern of a notched hand controller for the driver, but the Filovia and Lloyd-Kohler were the first to introduce pedal-operated controllers.



Mr. George H. Searle, M.Inst.T., marked the approaching end of his term of office as Mayor of Reigate by entertaining friends from the Institute of Transport. Above are seen Wing Commander D. F. Whitehead, Mr. W. C. Collins, Councillor George Searle and Mr. A. Packham

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B.R.S. PARCELS TRAFFIC IN THE METROPOLIS

London and Provincial Deliveries Segregated

FEWER DEPOT TRANSFERS: QUICKER TRANSITS

AN important change in the handling of traffic in the London parcels area of British Road Services is being introduced with the object of accelerating deliveries and cutting out known bottlenecks in the smooth flow of smalls and parcels, especially at peak working periods. Briefly, consignors will be asked to segregate their traffic into two parts: (a) consignments for re-delivery in the London parcels area; and (b) consignments for delivery in the provinces. One van will then call daily or as required for London traffic, another for the country traffic.

It is hoped that this will enable B.R.S. (Parcels), Limited, to speed up transit times for both streams of traffic. London traffic will go to a depot specialising in London area deliveries and provincial traffic will go to another depot for direct transfer to vehicles to prearranged destinations. The plan involves also the final winding up and integration of the residual Bouts-Tillotson, Fisher Renwick, Holdsworth and Hanson, McNamara and Sutton parcels or smalls services which have continued since 1948 parallel to, and on a more or less autonomous basis within the framework of, the B.R.S. parcels organisation. In the process a number of London depots used by these services will be closed or their functions altered. Smalls and parcels are bound up in the reorganisation. There will no longer be a Metropolitan smalls branch, instead smalls will be dealt with through suitable avenues of one overall system.

One early consequence of the plan should be the closure of Whitecross Street, Finsbury, the former Sutton depot. This was originally the back door, as it were, to the Sutton headquarters in Golden Lane, which are now only a rubble-strewn memory, and henceforward there will be no physical links with this once-famous business in London. In passing it is of interest to record that in the process of reorganisation during the past 10 years the 600 or so agents in all walks of life to whom Sutton and Company used to deliver its parcels throughout the country have dwindled to a solitary one, at Newbury, due to the channelling of operations through B.R.S. parcels depots.

Capital Expenditure

Substantial capital expenditure will be incurred in the implementation of this London scheme, which has the full approval of the B.R.S. board of management, and its carrying through will occupy, it is estimated, some 12-18 months. Provincial terminals have been, and will continuously be, put in the picture as implementation of the scheme proceeds.

At the present time there are 20 depots in the London parcels area, and eight of them handle traffic to and from the provinces. The perpetuation of the aforesaid parallel parcels services since the pre-nationalisation era has itself meant considerable duplication of services between large cities, since each London depot has to mount its individual connections with opposite numbers in the provinces. The position is further complicated by duplication of depots in provincial cities—a legacy of the past also—but in Liverpool, Gateshead, Leeds, Sheffield, Birmingham and Leicester it is planned to have one large depot only; the Liverpool (Huskisson) and Gateshead depot schemes are now well advanced. In the London area there are some 700 vehicles engaged on collection and delivery or allied functions.

Macclesfield Road depot in Clerkenwell, E.C.1 (reputed to be the largest parcels depot in the world), freed of trunk services, will in future be the focal point for traffic with origin and destination in the London area. The long-established system of working this traffic with transfers between Central London and inner suburban depots (Harrow, Acton, Tottenham, Stratford, Chelsea, Surbiton, Croydon, Eltham) will be progressively modified to the extent that there will be more direct routing through Macclesfield Road and less use of the suburban depots, certain of which may eventually be dispensed with. Macclesfield Road is itself to be extensively rebuilt and some work is already in hand.

Three Provincial Traffic Depots

Three depots will share the handling of provincial traffic. They are: for such traffic originating or destined generally south of the Thames, Willow Walk, Bermondsey, S.E.1; for traffic to and from the north-to-west sector of London, Coppetts Road, Muswell Hill, N.10; for traffic to and from the north-east London sector, Waterden Road, Stratford, E.15. Entirely new depots are eventually proposed for both the North London sectors, but in the meantime Waterden Road depot has been substantially doubled in area to fit it for its new purpose and Muswell Hill will have the assistance of Acton depot until the new terminal is constructed.

The enlargement of Waterden Road (former Bouts-Tillotson headquarters) has been achieved by taking in the adjacent depot (formerly R. J. Weeks), which was used as a workshop. The engineering work done here has been transferred to the Enfield divisional workshops. Acton is normally a suburban parcels depot; the traffic now

displaced will, it is anticipated, be redistributed to adjacent suburban depots in the interim phase. The former North of Thames parcels branch headquarters at Harrow Road, Paddington, will in future be chiefly concerned with warehoused traffic.

Consignments either to or from the provinces will be routed direct through the appropriate focal depot and there will no longer be an intermediate tranship and transfer journey between Central London and the suburban depot. For example, a consignment from Birmingham to Kingston will be routed into Willow Walk and go out direct to consignee instead of on a transfer vehicle to Surbiton depot and from there on the local vehicle. In this way inwards provincial deliveries will be saved one handling at least and transit times may benefit by as much as 24 hours and a similar saving should accrue to consignments outwards to the provinces.

Incidental Advantages

Two principal objectives of the plan have already been outlined: faster transits, elimination of bottlenecks at depots. In addition it is envisaged that there will be a sizable reduction of costly and time-consuming transfer movements across and around London; expensive handlings, with attendant risk of loss or damage to goods, will be reduced in numbers; the total mileage run by collection and delivery vehicles, and by transfer units, should be pruned. Initially the direct delivery for provincial traffic referred to will be confined to the inner core of the London area and transfer will still be necessary for the fringe area, save perhaps for places such as Crawley, where the New Town attracts sufficient traffic for a direct service from Willow Walk. The London parcels area is bounded by Knebworth, Hertford, Brentwood, Tilbury, Sevenoaks, Horsham, Aldershot, Henley-on-Thames, Aylesbury and Harpenden.

Traffic Estimates

Estimates of how many customers are likely to benefit from the improved provincial services are difficult because it is only possible to draw on the experience of regular users. However, it is believed that out of about 10,000 regular customers about one quarter send half of their B.R.S. parcels traffic out of London. All such users will in future be supplied with two consignment books in order to keep the two categories of traffic conveniently separate.

British Road Services emphasises that there is no compulsion upon a trader to segregate his traffic if it is inconvenient, by reason of his working arrangements or lack of dispatch space, for example; equally the smallest sender need not shrink from calling up both services even though he may have only one package for each. The aim will be throughout to give maximum consideration to the customer's requirements, but it is pointed out that if he does not segregate he will be foregoing a valuable advance which is offered at no cost to him. As to the problem of two vehicles calling instead of one, it should be remembered that because of the duplication of provincial services already referred to this is already happening in many instances. It is not anticipated that there will be any material change in the total of vehicles needed since the duplication of collection and delivery will be taken care of by a progressive readjustment of van areas. Better loading will be the aim.

INDIAN ELECTRIFICATION

Tenders for Railway Extensions

CALLS for tender are expected to be issued within the next few months for work and materials in connection with further electrification on the Southern Railway of India. The single line from Madras City to Tambaram is already electrified. New work will involve the laying of an additional track on this section, involving 16 miles of track and six miles of siding at 11 intermediate stations, which is to be electrified for both 1,500 volts d.c. and 25 kV single-phase a.c.; and extension of the line on a single track from Tambaram to Chingleput, involving 19 miles of track and six miles of siding at four intermediate stations electrified for 25 kV single-phase a.c. only.

Broadly, the whole scheme will require complete overhead equipment, including erection, equipment for one 25-kV substation and between six and 10 dual-voltage electric locomotives.

The transfer of the signal and telegraph works of Tyer and Co., Limited, from Dalston to Merrow has been satisfactorily completed and the new works is in full production. The technical and administrative staff are now being transferred to Merrow, so that offices and works function as one operational unit. As from May 11, the office address is: Tyer and Co., Limited, Perran Works, Merrow Siding, near Guildford, Surrey (Guildford 2211, three lines; telegraphic address: Switchmen, Guildford).

B.T.C. TRAFFIC RECEIPTS: PERIOD NO. 4—1959

	Four weeks to April 19, 1959			Aggregate for 16 weeks		
	1959 (£ thousands)	1958	+ or -	1959 (£ thousands)	1958	+ or -
PASSENGERS						
British Railways ...	10,529	10,522	+	35,977	35,694	+
London Transport						
Railways ...	1,807	1,758	+	7,284	7,207	+
Road Services ...	4,103	4,372	-	16,029	17,560	-
Provincial and Scottish Buses ...	4,318	4,259	+	16,337	16,362	-
Ships ...	441	440	+	1,135	1,064	+
Total Passengers	21,198	21,351	-	76,762	77,887	-
FREIGHT, PARCELS AND MAILS						
British Railways	7,127	7,951	-	29,825	33,456	-
Merchandise and livestock ...	3,190	3,756	-	13,676	15,617	-
Minerals ...	8,109	9,937	-	38,135	42,270	-
Coal and coke ...	4,031	3,991	+	15,876	15,787	+
Parcels, etc., by passenger train ...						
Total Freight British Railways	22,537	25,635	-	97,512	107,130	-
Others ...	4,021	3,985	+	16,028	16,170	-
Total Freight, Parcels and Mail	26,558	29,620	-	113,540	123,300	-
Aggregate	47,756	50,971	-	190,302	201,187	-

Comparisons are affected by changes in fares and rates which have been authorised from time to time

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MANCHESTER: (2): 270/1 Royal Exchange Buildings. Blackfriars 9287/9
BRISTOL: (1): 61 Park St. Bristol 25435/6

ARDROSSAN: (Ayrshire) Harbour Street, Ardrossan-Saltcoats 1911/2
GLASGOW (C.2): 10 Bothwell St. City 6997/8
LONDON: (Depot) Elland Rd., S.E.15. New X 4885/7
LONDON: (Offices) 79 Dunton Rd., S.E.1. Bermondsey 4881/4

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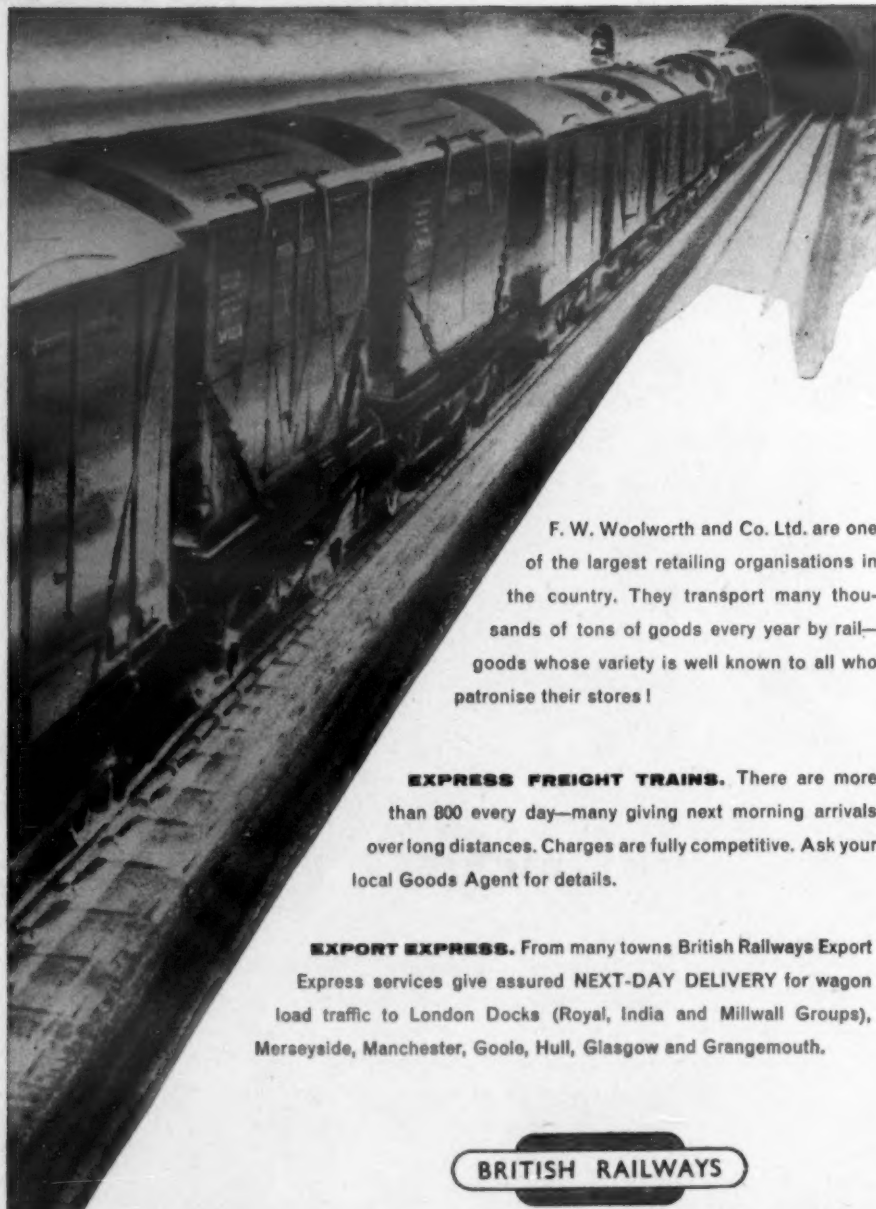
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BRITISH RAILWAYS

THAMES NAVIGATION SERVICE

P.L.A. Opens Important New Facility

AFTER several days during which test messages were sent with the collaboration of vessels using the Port of London, the Thames Navigation Service was introduced at 09.00 hours on May 1 by the Port of London Authority. It was, moreover, an achievement on the part of all concerned that the date for commencing operation, which was determined in 1957, should have been kept. The purpose of the service is to provide all vessels using the port with any information that they may require and this applies particularly to arrangements for berthing and navigational matters such as the state of the tides, weather conditions—particularly visibility—the position of wrecks and the availability of river berths for anchoring pending being able to proceed up or down river.

The service is based in a new building provided at a cost of close on £80,000, which adjoins Royal Terrace Pier, Gravesend, and one of the reasons which led to the selection of the site was that it would assist materially in the surveillance of Gravesend Reach where is to be found the largest concentration of shipping leaving and entering the port. Especially is this the case when visibility is poor. In the new building, which has been designed to allow for its being enlarged if circumstances so require—additional floors can be added—is the operations room, which is manned night and day.

Operations Room

In the operations room three operators sit at a control desk on a raised dais facing a 20-ft. long illuminated map of the river. This map is marked with the positions of vessels lying at buoys and anchorages, dredgers, wrecks and other obstructions, the degree of visibility at all points, the state of the tide and other features of navigational significance from London Bridge to the Thames Estuary. The information is, of course, kept constantly up-to-date. Existing tide gauges on the river are also linked to record directly into the operations room.

There is a raised gallery behind the duty officer from which pilots stationed at Gravesend, who, of course, use Royal Terrace Pier, may observe the state of the river and, if they wish, ask for additional information. It may be added that the layout has been specially designed to give them easy access to the gallery on their way to or from the pier.

Radar Coverage

At present the radar coverage of the service extends from a point above the western entrance to Tilbury Docks to Lower Hope Point, but provision is made in the layout of the room for up to eight displays in all to be accommodated, and these would cover from the seaward port limits to the Royal Docks. The additional radar screens can be installed without inconvenience to the operations. The set, which is a Decca Type 33 harbour radar, is installed in a well in front of the duty officer and below the illuminated map.

conversations and messages for future reference. The five channels, allocated under international agreement, are numbers, 12, 14, 16, 20 and 22. These are handled by individual transmitter-receivers at Shooters Hill in South East London and at All Hallows. These stations are remotely operated from the control room.

At present, harbourmasters wishing to know the state of the tide or the extent of visibility are dependent on information telephoned at intervals by observers in different parts of the harbour. Such information is naturally rather sketchy and where conditions are changing rapidly it is apt to be inaccurate. Since, however, harbourmasters, until recently, have not been able to communicate directly with ships using their harbours, there has been no incentive to improve the flow of information to the harbour office. The development of the v.h.f. radio telephone has, however, completely changed the picture—a fact which has been fully appreciated by the Port of London Authority. In planning the new information centre it was realised that, in order to make the best use of the ability to speak directly to vessels, there would be a need for up-to-the-minute information of tide and visibility over the whole course of the river.

Since no suitable equipment existed, it was necessary to start from scratch. The Aga scheme for telemetering the tide was developed by the Gas Accumulator Co. (United Kingdom), Limited, of Brentford, using Pye radio links. This was subsequently modified to include provision for transmitting information on local visibility as measured by a fog detector which had recently been developed by Stone-Chance, Limited, of Crawley. A prototype of the equipment is now ready for installation and trials. It consists of a tide coder at a remote point on the river, working in conjunction with a float operated tide level meter, a visibility detector, a control unit and a u.h.f. transmitter set, which are all designed for 12 volts d.c. operation and may be run off batteries. At the information centre there is a u.h.f. receiver equipment, decoding apparatus and tide level and visibility indicators and chart recorders. The equipment can be extended to give immediate information on tide and visibility at 16 places on the river.

Visibility Measurement

Since 1957 when Stone-Chance, Limited, received the premier award for the most outstanding engineering exhibit at the Association of Supervising Electrical Engineers' Exhibition, following the culmination of years of experimental work by the research and development department of Trinity House with which the company co-operated to introduce an automatic device for detecting fog and measuring visibility continuously from a given point, the fog detector FD1 has been ordered for many lighthouses. The same invention by Trinity House and the principle of



The new P.L.A. Thames Navigation Service building at Gravesend with the 6-ft. scanner of the Decca Type 33 radar on the roof



The Stone-Chance FD3 fog detection unit and, right, the operations room with Commander G. V. Parmiter, assistant to the chief harbourmaster and river superintendent, explaining its functions. A party is inspecting the radar screen in the well

Apart from the layout making possible additional installations, it also embodies in the room beneath a special platform which gives easy access for servicing purposes without entering the control room.

The scenic display of the Thames is equally divided into eight panels and division has been made from the Lower Hope Point into west and east sectors. Three radio channels each have been allocated to the west and east sections while vessels arriving at the Sea Reach Buoy No. 1 at the lower limit of the port also use the international "calling and safety" channel to make initial contact.

Radio-Telephones

When in the river they can make use of a further ship-to-ship channel and two alternative channels for tug operations. Tankers using oil wharves at Thames Haven, Shell Haven, Canvey and on the Medway have had a separate channel earmarked for them as a berthing frequency.

Pye v.h.f. frequency-modulated radio-telephones are used throughout the scheme. This frequency-modulated type of communications system for international maritime use was agreed at the Hague Convention and is being widely adopted at ports throughout the world. Pye Marino, Limited, has supplied and installed all transmitting and receiving radio-telephone equipment in the Port of London scheme. Also installed at Gravesend is a special British Communications Corporation tape recorder capable of simultaneously recording, on all five channels,

operation have now been applied to the problem of automatically and remotely indicating visibility on the turns in a river. The degree of accuracy obtainable in FD1 is not called for but the FD3 shows into which of five categories visibility falls, namely over 1 mile; $\frac{1}{2}$ to 1 mile; $\frac{1}{4}$ to $\frac{1}{2}$ mile; $\frac{1}{8}$ to $\frac{1}{4}$ mile; and less than $\frac{1}{8}$ mile.

The value of the service must depend to some extent on how quickly shipowners can fit their vessels with v.h.f. frequency-modulated radio equipment, as until the large majority of the ships using the port is so equipped the information available will not be as complete as is desired. At the present time, 165 ships using the port have v.h.f. radio equipment, including many of the most frequent users, such as colliers. This represents about 10 per cent of the total number of ships using the port. The rate of ship fitting is, however, proceeding most satisfactorily, and 800 ships are expected to be equipped by the end of the year.

On April 28 the Institute of Advanced Motorists enrolled its 10,000th member, who received her certificate and badge from the Minister of Transport, Mr. Harold Watkinson. The Minister had already recognised the value of the institute in encouraging better driving by appointing a Ministry representative to the council of the institute. Formed in March, 1956, the institute's examiners have now conducted over 16,000 advanced driving tests, despite the Suez crisis, which practically stopped testing for a period.

SOCIAL AND PERSONAL

South African Railways

WHEN Mr. D. M. Robbette retires from the deputy general manager of South African Railways on May 19 he will be succeeded by Mr. J. P. Hugo, M.Inst.T., who has hitherto been assistant general manager (staff). He joined the railway system in 1927 and was chief superintendent (staff) before assuming the above-mentioned position, both of these appointments dating from 1954.

Mr. J. C. O'Connor, F.C.A., has been appointed a director of Aer Rianta and Aer Lingus.

A week's visit to Great Britain was recently concluded by Mr. Frank W. Jenks, president of the International Harvester Company of Chicago. With him came Mr. J. L. Camp, vice-president in charge of all overseas operations, Mr. Paul Brantingham and Mr. John Murphy, managers of engineering and manufacturing for overseas operations of International Harvester Company. His tour in the U.K. included visits to the London general office and to the works at Bradford and Doncaster.

Mr. E. A. Langridge, as already announced, retires from the position of development engineer, British Railways Central Staff, on May 16. He was apprenticed to Dugald Drummond at Eastleigh, but transferred to the former Midland Railway at Derby in 1919 and became development assistant to the chief mechanical engineer, L.M.S.R., in 1944. He has been connected with steam and diesel locomotive design until taking up his present position in 1956. He has completed 46 years' railway service under 11 C.M.E.s.



Mr. E. A. Langridge

The Sir George Earle Trophy, the top award in this country for industrial safety, has been won this year by Vauxhall Motors Limited. It will be presented to the company by Sir Howard Roberts, president of the Royal Society for the Prevention of Accidents, at the National Industrial Safety Conference at Scarborough on May 8. The citation to the award says that the trophy is to be presented to Vauxhall Motors in recognition of "more than 30 years of outstanding effort to ensure a safe working environment for their employees." The citation also makes special mention of the fact that over the past 3½ years Vauxhalls' several hundred apprentices have achieved a record of no accidents involving lost time in 3½ million hours worked.

Mr. K. B. Harrison has been appointed fleet sales manager of Dodge Brothers (Britain), Limited. Prior to this appointment Mr. Harrison was Midlands area manager for Thornycroft and before that overseas service engineer for Nuffield Exports.

The British Railways Amateur Boxing Championships were held on April 30 at the Royal Albert Hall. Sir Brian Robertson presented the awards. The regional challenge shield was won jointly by the Southern and Western Regions, two regions which have not appeared as winners in previous years. The shield will be held by each region for six months.



Presentations marking the retirement of Colonel Arthur Jerrett (centre) from the managing directorship of Guy Motors, Limited, and of Mr. C. Owen Silvers (left) from the board of the Sunbeam Trolleybus Co., Limited, an associated company, were made by Guy directors at a luncheon at Wolverhampton on April 29. Colonel Jerrett received a gold watch and Mr. Silvers a silver salver. Making the awards was Mr. A. L. Blower, chairman of Guy Motors.

Mr. E. J. Lassen, who has been export manager of Bakelite, Limited, since the export unit was established in 1945, has retired after 28 years' service with the company. He is succeeded by Mr. G. H. Johnson, deputy export manager.

Mr. G. A. Hughes, assistant, general manager's office, Euston, London Midland Region, has been appointed a traffic costing officer at B.T.C. headquarters. Mr. C. R. Stuart, assistant traffic costing officer, Birmingham, becomes acting traffic costing officer, Birmingham.

Mr. J. S. Kemp, general sales manager, car and truck domestic division, Ford Motor Co., Limited, will shortly be taking up an appointment with the Ford Motor Company in Detroit. He is succeeded, effective immediately, by Mr. J. E. Read, formerly executive assistant to the general sales manager.

Mr. W. E. G. Hewings, LL.B., has been appointed works officer, London Transport Executive, with effect from May 1. He will be responsible for co-ordinating arrangements for approval and subsequent progressing of new works projects. Mr. P. E. Garbutt, M.B.E., has been appointed to the new post of superintendent (new works) in the railway operating department with the rank of principal executive assistant. Messrs. A. V. Bond, A.M.I.Struct.E., and D. F. Pelle, F.R.I.C.S., senior executive assistants in the department of the architect, are promoted principal executive assistants.

Mr. G. H. Caithness has been appointed Scottish representative of Connolly Brothers (Curriers), Limited, to succeed the late Mr. James Melville.

We record with regret the death of Mr. G. F. Littlewood, traffic manager of the Port of Bristol Authority. He had been with the undertaking for 48 years.

Mr. J. Sanders, special sales representative at the Cardiff depot of the Dunlop Rubber Co., Limited, since 1947, has been appointed manager of commercial vehicles division north.

Mr. I. McPhail has been appointed Swissair manager for Scotland. He replaced Mr. P. Kessler, who is returning to head office in Zurich as assistant to the general sales manager.

Mr. F. A. C. Guépin, a managing director of Royal Dutch Petroleum since June, 1950, has intimated his wish, now that he has reached the age of 60, to retire on June 30. Mr. A. Holland, O.B.E., has been nominated for appointment as a new managing director of Royal Dutch Petroleum.

Sir Graham Cunningham, chairman of Triplex Holdings, Limited, and chairman and managing director of the Triplex Safety Glass Co., Limited, has been elected a fellow of the Imperial College of Science and Technology, of which he has been Crown governor for 15 years. It is only rarely that a non-scientific fellow is elected.

Mr. C. B. Leith, deputy general manager of David MacBrayne, Limited, has been appointed general manager in succession to Mr. H. S. MacLauchlan, who retired for health reasons on May 1. Mr. Leith joined the company in 1935 from Coast Lines, Limited. He became assistant general manager in 1946 and deputy general manager in 1958.

Mr. V. J. Owen, A.M.I.Mech.E., has been appointed assistant engineer with Ribble Motor Services, Limited, in succession to Mr. G. Swindlehurst, who recently left to become chief engineer with Jamaica Omnibus Services, Limited, Kingston, Jamaica. Mr. Owen will thus be returning to Ribble on June 1 after an absence of three years, during which time he has been assistant engineer, Trent Motor Traction Co., Limited.

We regret to record the death, at the age of 57, of Mr. G. A. Rotinoff, M.A.(Cantab.), A.M.I.C.E., chairman and managing director of Rotinoff Motors, Limited, of Poyle, near Colnbrook. Born in the Caucasus, he served an apprenticeship in civil engineering in this country and was subsequently a director of West's Rotinoff Piling and Construction Co., Limited, and chairman and managing director of Rotinoff Construction, Limited.

The G.W.R. special trainees' 28th annual reunion took place at the Great Western Royal Hotel on April 24. The chair was taken by Mr. D. W. M. Wilson, road motor engineer, Western Region, B.R., and 39 members of the old training scheme attended. The toast "British Railways" was proposed by Mr. D. Layton, National Coal Board, and responded to by Mr. G. R. Bonavia, sales assistant to the traffic manager, Eastern Region, Cambridge. The toast "Colleagues Overseas" was proposed by Mr. E. Havers and responded to by Mr. D. D. Bartlett, retiring general manager, Malayan Railway, and also Mr. H. J. Shailles, chairman of the Penang Port Commission, Malaya, on leave.



The British Transport films service celebrated its tenth anniversary with a series of successes gained at the Harrogate Festival of Films in the Service of Industry where, showing 14 films, the B.T.C. Films Service won awards in six of the nine categories. Here Mr. Edgar Anstey, B.T.C. films officer, receives one of the awards from Viscount Monckton.

Mr. G. Skinner, inspection and dispatch manager, A.E.C., Limited, Southall, retired after 40 years' service on April 30. A.C.V. directors and his old colleagues in the person of Mr. A. S. C. Chattey, director of A.C.V., made him a presentation. He became superintendent of sales inspection in 1938 and was appointed assistant home sales manager also in 1944. On the A.C.V. group merger he became inspection and dispatch manager.

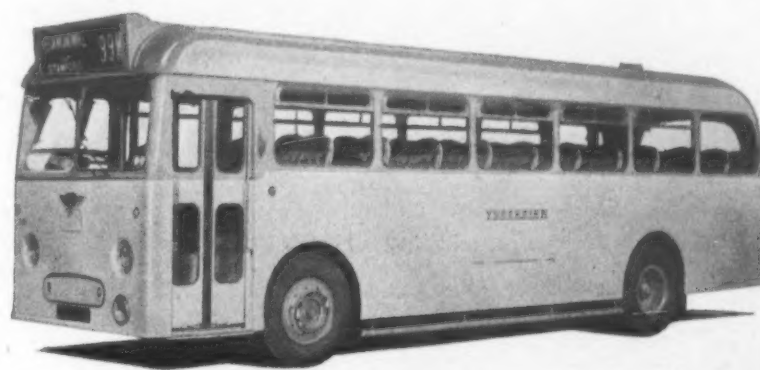
At the fifth annual general meeting in Peterborough of the Railway and Canal Historical Society, Mr. Charles R. Clinker was re-elected president, Mr. F. G. M. Watson, hon. treasurer, and Mr. M. I. Berrill (33 Top Road, Calow, Chesterfield, Derbyshire), hon. secretary. Progress was recorded in all the activities of the R.C.H.S. At a subsequent dinner the society entertained Alderman S. Strickland, chairman of the River Nene Board, on whose waterway they travelled by barge on the following day to Oundle.

Mr. S. C. Bond was re-elected president and chairman of the Traders' Road Transport Association at the annual general meeting on May 5. The four vice-chairmen are Messrs. S. J. Lamborn, K. C. Turner, S. S. Robson and J. Delicate. Mr. S. Hattan was elected national hon. treasurer in succession to Mr. J. Janes. The president expressed the indebtedness of the association to Mr. Janes for his services over a long period; they were also losing the services through retirement of two vice-chairmen, Messrs. C. E. Jordan and S. H. Jones, who had been stalwarts of the T.R.T.A. for many years. They retired with the good wishes of all.



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takes the biscuit

Mr. C. Dalziel is the proprietor of a large baker and confectioners business in Airdrie, Scotland. His fleet of forty-five Morris vans operate on a two shift basis, and work as long as twenty hours daily on stop start delivery. The average annual mileage for the Dalziel vans is something like 80,000 miles, and the daily stops top 300. Ten of the vans have now been converted to Perkins 'Four 99' diesel power, and even under these most exacting conditions of operation, are averaging overall 45 miles per gallon compared with 16 to 18 miles per gallon of the petrol powered vans. No wonder Mr. Dalziel is, in his own words, "more than delighted" with the performance of his Four 99 diesel engines, and a further ten of his vans are booked for similar conversion in the immediate future.



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IMPORTANT CONTRACTS

Large Pakistan Order for Bedfords

REMARKABLY quick delivery is a feature of a contract placed by the Supply and Development Department of the Pakistan Government for 912 Bedford diesel bus chassis. Delivery starts during June and will be completed by the end of the year. The vehicles will be shipped from Dunstable in knocked-down form, to be assembled at the General Motors plant in Karachi; bodies will be built locally. Khartoum Municipality has also ordered Bedford diesel bus chassis, 30 of which scheduled for delivery within the next few weeks fitted with Mulliner 40-seat all-metal bodies will be the first Bedford buses to operate in the Sudan. Further overseas orders for Bedford passenger chassis, now in hand include 50 for Egypt, 32 for Malaya, 13 for Ba. bados, 10 for Mauritius and four for Greece, which are additional to the regular flow to General Motors.

New Scottish Region Contracts

The following contracts have been placed by the Scottish Region of British Railways:

T. Boland and Co., Limited, Edinburgh, for construction of new signalbox at Kinnell Colliery, B. p. n. s.
Coventry Climax Engines, Limited, Coventry, for three fork-lift trucks at Barrow Works.
James Miller and Partners, Limited, Edinburgh, for renewal of superstructure and other work on Charlotte Street bridge between Craigendoran and Helensburgh Central.

Dundalk-Built A.E.C.s

To meet growing demand for A.E.C. vehicles in Ireland, Commercial Road Vehicles, Limited, one of the I.E.C. group of companies, began on May 1, at its Dundalk works, the progressive manufacture of this range of passenger and goods vehicle chassis. On that date it also took over the sales and service of all A.E.C. vehicles formerly undertaken by A.C.V. Sales, Limited, at 125 Summerhill, Dublin.

More British Tractors for U.S.A.

Visiting this country recently, Mr. F. W. Jenks, president of International Harvester Company, Chicago, was specially interested to see at the Bradford factory of International Harvester Company of Great Britain, Limited, B275 wheeled tractors being prepared for shipment to the United States. Large orders have been placed recently, the first ever placed by the parent company with a foreign subsidiary, though Bradford-built I.H. tractors already sell well in Canada. It will be recalled that British Ford tractors are also exported in quantity to the United States.

ACF Industries in Britain

ACF (Great Britain), Limited, 55-57 High Holborn, London, W.C.1, has been established as European representative and British licensee for ACF Industries, Incorporated (American Car and Foundry) and that group's product divisions. Activities in London have been broadened to bring ACF products in addition to oilfield and pipeline valves and fittings to European markets through licensing arrangements. Additional products include carburetors and other automotive fuel-system components of Carter Carburettor division; railroad equipment, includ-

ing rolling stock, of American Car and Foundry division; and electronic and electro-mechanical components made by ACF's Avion and Nuclear Products—Erco divisions.

North Eastern Region Contracts

Recent contracts placed by the North Eastern Region of British Railways include:

Dow-Mac (Products), Limited, Stamford, for supply of concrete bridge beams.
British Electrical Repairs, Limited, Newcastle, for rewinding 1000-kW rotary converter armature.
Bray Construction Equipment, Limited, Feltham, for one tractor-shovel and attachments.
Blackwood Hodge and Co., Limited, London, for two Gradall multi-purpose construction machines, with attachments.
Acrow (Engineers), Limited, London, for one 30-cwt. overhead travelling crane for Simonside wheel shop.
Tarsia, Limited, Stockton on Tees, for substructure work on bridge at Ryhope.

London Midland Region Contracts

The London Midland Region of British Railways announces the following contracts:

North Thames Gas Board, London, N.7, for renewal of gas mains at St. Pancras Chambers.
Leonard Fairclough, Limited, Adlington, for bridge and tunnel alterations between Queen's Drive and High Street on Birmingham inner ring road.
Rubert Co., Limited, London, W.C.1, for waterproofing deck units of bridges at River Esk Viaduct and Runcorn Viaduct.
Butterley Co., Limited, Derby, for reconstruction of superstructure of bridges on Leicester and Trent Line and between Betley Road and Crewe.
The Turfitt Construction Corporation Co., Limited, Warwick, for construction of traverser pit at Crewe locomotive works.
Aerocem, Limited, London, W.1, for strengthening embankment between Leighton Buzzard and Bletchley.
Leonard Fairclough, Limited, Adlington, for construction of additional span to bridge at Norton Bridge Branch to accommodate widening of the Winchester—Preston trunk road A34.

TENDERS INVITED

THE following items are extracted from the Board of Trade Special Register Service of Information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lecon House, Theobalds Road, London, W.C.1.

May 13—Ceylon.—International Co-operation Administration for three petrol-engined 16,000-lb. g.v.w. 24 cu. yd. (struck) hydraulic tipping lorries. Tenders to the Chairman, Tender Board, Ministry of Transport and Works, P.O. Box No. 547, Colombo, 1. (ESB/7410/59/ICA.)

May 14—Ethiopia.—Imperial Highway Authority for eight 100-d.b.h. diesel tracked tractors with rear power controls and angle dozers. Tenders to Imperial Highway Authority, P.O. Box 1770, Addis Ababa. (ESB/9008/59.)

May 15—Union of South Africa.—South African Railways for 31 motor vehicles ranging from cars to 3-ton lorries. Copy of tender documents available on loan from Export Services Branch, B.O.T. (ESB/9085/59.)

May 20—Ethiopia.—Imperial Highway Authority for one heavy-duty articulated vehicle comprising six-by-four diesel tractor with 50-ton winch and 50-ton capacity low-bed machinery semi-trailer. Tenders to the Imperial Highway Authority, P.O. Box 1770, Addis Ababa. (ESB/9081/59.)

May 20—Australia.—Victorian Railways for about 1,700 roller-bearing axleboxes. Photocopies of tender documents from Export Services Branch, B.O.T., price 4s. (ESB/9289/59.)

May 21—Ethiopia.—Imperial Highway Authority for four petrol-engined PICK-UP TRUCKS of 4 tons g.v.w. Tenders to the Imperial Highway Authority, P.O. Box 1770, Addis Ababa. (ESB/10434/59.)

Agency Inquiry—Bahrain.—The firm of Yusuf bin Ahmed Kanoo, Bahrain, is seeking a local agency for DIESEL ENGINES (preferably air-cooled) up to 60 b.h.p. (ESB/3837/59.)

Export Opportunity—U.S.A.—The Matthis Company, 57 Post Street, San Francisco, would like to receive literature and prices from manufacturers in the United Kingdom for railway WAGON TIPPERS. (ESB/7300/59.)

SHIPPING AND SHIPBUILDING

Report from Leven

MODERNISATION by William Denny and Brothers, Limited, of its Leven yard at Dumbarton has so far cost about £1½ million and a further £500,000 will have been expended before the work is complete. The aim has been to clear away old structures and introduce work flow methods which permit maximum use of new materials and machinery. The first three stages have occupied the past four years; the final stages of the plan involve the fitting out facilities. Five of the previous nine berths in the yard have been eliminated and when the scheme is finally completed the yard will be reded to two berths for merchant ships and one for naval work. A massive prefabrication bay and workshops have been constructed.

Under this covered area, large sections are being fabricated under working conditions which allow comfort and speed previously impossible. In future prefabrication will be pursued to the maximum while retaining the traditional craft skills. The prefabrication area is served by cranes capable of lifting 25-ton sections. By this streamlining of methods Denny Brothers hopes to save 10 per cent of the time normally needed to build a ship, and will expand output from four to six ships a year. The yard has work on hand which will allow continuity until 1961 and will continue to employ its present labour force of 1,200 even though modernised on the present lines.

Trade at Whitstable

SINCE Whitstable Harbour was taken over from the British Transport Commission by the urban council, the tonnage handled is stated to have shown a distinct upward trend. Over a period of 12 months it went up to 50,000 tons compared with 42,000 tons under the previous owner. Revenue from April 1, 1958, to mid-March, 1959, was £335 in excess of the estimate of £4,790. Of the goods handled, 8,000 to 9,000 tons were imported peas, potatoes came from Ireland, grain from Amsterdam and 6,000 tons of barley left for Rotterdam. The harbour is undergoing considerable improvement.

Nuclear Reactors for Marine Use

SEVEN British firms which have developed commercial marine nuclear reactors this week staged a presentation of their equipment. With the Atomic Energy Authority (which has a gas-cooled reactor) they have already presented plans of their reactors to the Galbraith Committee which is to recommend after studies the most suitable nuclear machinery for Britain's first nuclear-powered merchant ship. The groupings concerned were: A.E.I.—John Thompson Nuclear Energy, Babcock and Wilcox, de Havilland Engine, G.E.C.—Simon Carves Atomic Energy Group, Hawker Siddeley Nuclear Power, Mitchell Engineering and Fairfield Shipbuilding and Engineering, and Vickers Nuclear Engineering (Rolls-Royce, Foster Wheeler, Vickers). The committee will not be able to make a recommendation until it has made a full assessment

in respect of safety, efficiency, reliability, weight, capital costs and operating economy.

Oscillograph Guidance into Port

SWEDISH experts, says a report, are actively investigating a system of underwater guidance which would assist navigation in the overcrowded approaches to ports and in canals when visibility is low. A cable is laid on the bed of the canal or harbour along the course of which the ships have to proceed and an oscillograph is installed in the ship. As the ship makes her way a light ray on the oscillograph points the exact position of the ship in relation to the cable. This method is being tested on a two-mile stretch of water at the entrance to the harbour at Limhamn, near Malmö.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

B.E.T. Omnibus Services

In the year ended March 31, 1959, B.E.T. Omnibus Services, Limited, shows a net profit, after £342,444 for taxation, of £446,287 (£451,647). On the ordinary stock final dividend is 11 per cent, free of tax (same).

Tarmac and Amalgamated Roadstone

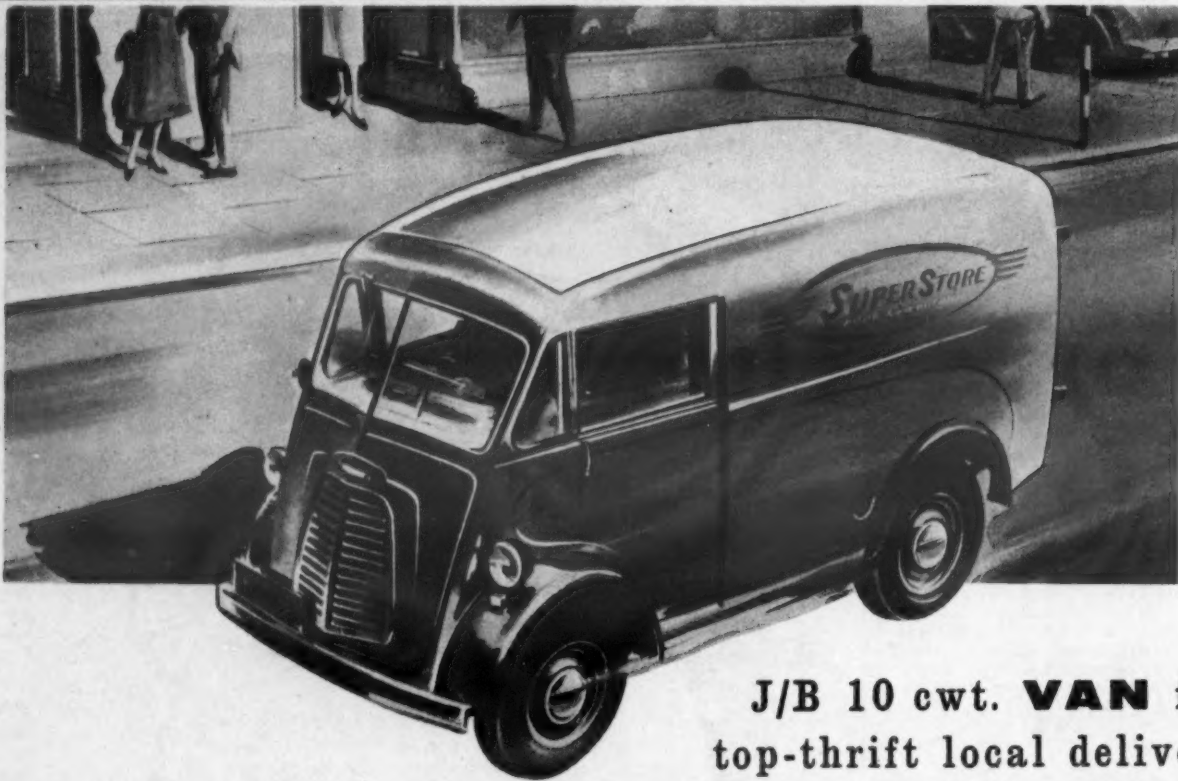
A merger between Tarmac, Limited, and Amalgamated Roadstone Corporation, Limited, is under consideration, a joint statement indicates. The interests of both groups are widely spread but, whereas those of the Tarmac group are more concentrated in the North and in the Midlands, the Amalgamated Roadstone organisation is particularly active in the South and West of England and in Wales. The latter group also has Northern interests and operates its own shipping company for raw material transport purposes.

Dunlop Rubber

The Dunlop Rubber Co., Limited, had a group trading balance for 1958 of £19,761,000 (£19,880,000). Depreciation takes £8,530,000 (£8,490,000) and replacement of fixed assets in United Kingdom £211,000 (£260,000), debenture and loan interest £1,044,000 (£1,015,000), U.K. and foreign taxation £5,360,000 (£7,438,000), leaving group net profit £5,787,000 (£5,026,000). Profits retained in the subsidiaries are £1,180,000 (£1,128,000), leaving Dunlop Rubber available net £3,567,000 (£3,017,000). A final dividend on the ordinary stock of 1s. 2d. per 10s. stock unit, equivalent to 12 1/2 per cent is being distributed, making 1s. 7d. or 16 1/2 per cent for the year (14 per cent). At the a.g.m. on June 8 the directors will submit proposals to increase the authorised capital from £40 million to £50 million and to capitalise £5,241,440 reserves, issuing stock to ordinary stockholders in the proportion of one for four.

Lancashire United Transport

After providing £108,658 for depreciation and £87,831 for income tax and profits tax net profit of Lancashire United Transport, Limited, for 1958 was £74,112 (£68,350). The Finance Act, 1958, has had an adverse effect, says the chairman Sir Robert Cary. Under previous Finance Acts a company carrying on a trade or business relating to the carriage of passengers by road and which was precluded by statute from charging more than the authorised price for such services was charged to profits tax at the rate of 3 per cent. Following on the 1958 Act, however, no special relief was given to such undertakings and they are now assessed in the same way as any other undertaking on a flat rate of 10 per cent. For 1958 the effect has been that the company will be paying over £8,000 more in profits tax. A final dividend of 5 per cent, together with a bonus of 5 per cent is being paid, making with the interim a total for the year of 12 1/2 per cent on the revised capital.



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